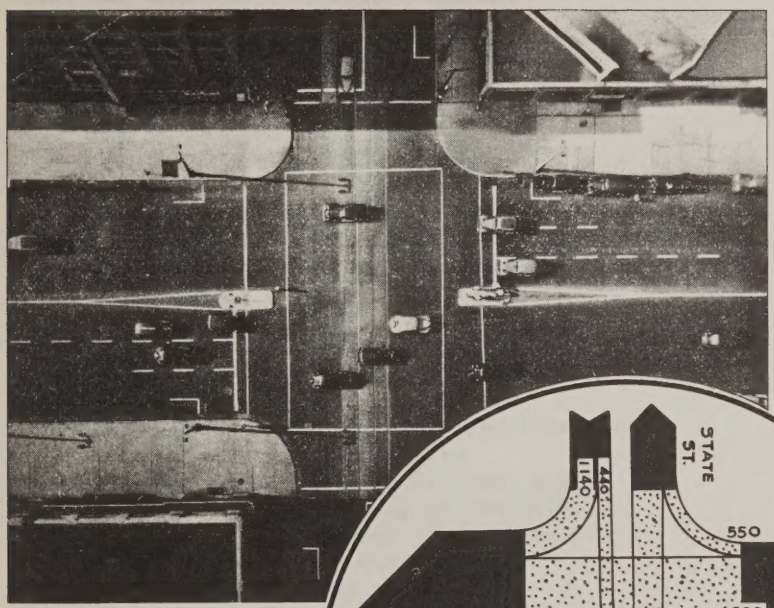
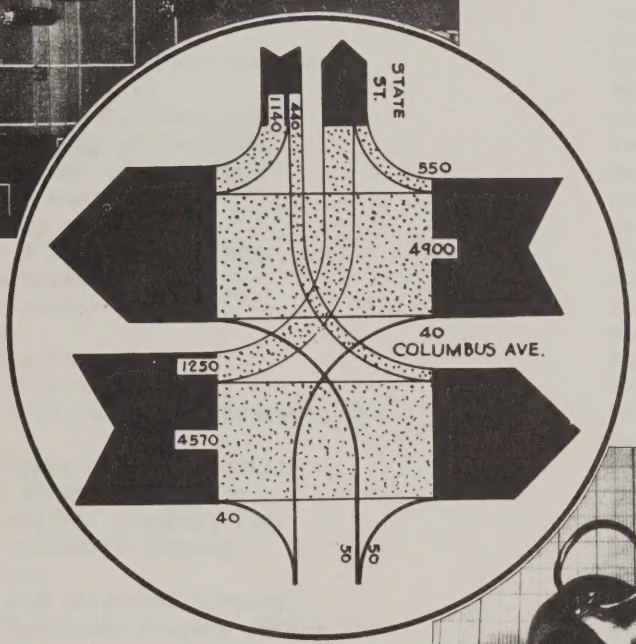
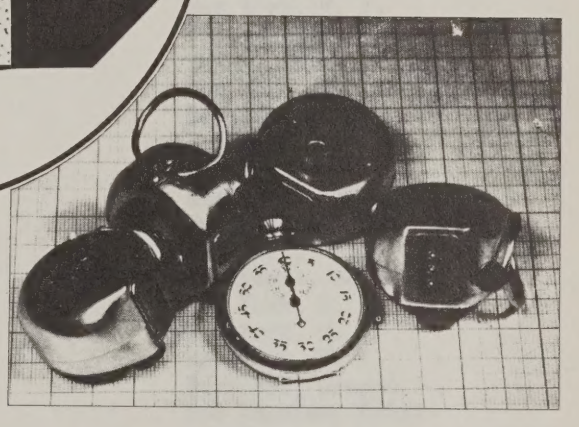
Traffic Survey Manual

NATIONAL CONSERVATION BUREAU

Traffic Survey Manual



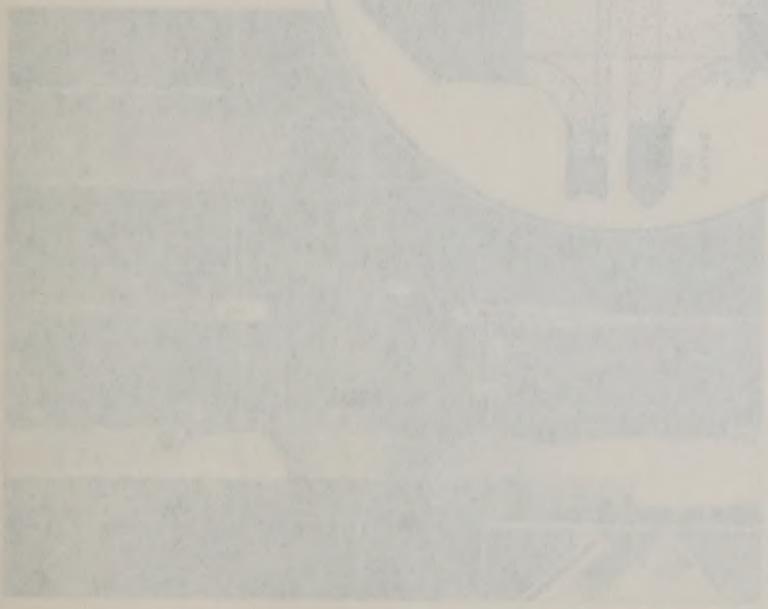




Prepared by
TRAFFIC DIVISION

National Conservation Bureau
A division of
Association of Casualty and Surety Executives
60 JOHN STREET NEW YORK, N. Y.

1939



TRAFFIC SURVEY MANUAL

MEMBERSHIP

ASSOCIATION OF CASUALTY AND SURETY EXECUTIVES

Acc.& Cas.Ins.Co.of Winterthur, Switzerland	New York, N. Y.
Aetna Casualty and Surety Company	Hartford, Conn.
Aetna Life Insurance Company	Hartford, Conn.
American Automobile Insurance Company	St. Louis, Mo.
American Bonding Company of Baltimore	Baltimore, Md.
American Casualty Company	Reading, Pa.
American Credit & Indemnity Co. of N. Y.	St. Louis, Mo.
American Employers' Insurance Company	Boston, Mass.
American Re-Insurance Company	New York, N. Y.
American Surety Company of New York	New York, N. Y.
Associated Indemnity Corporation	San Francisco, Calif.
Bankers Indemnity Insurance Company	Newark, N. J.
Car and General Insurance Corporation, Ltd.	New York, N. Y.
Central Surety and Insurance Corporation	Kansas City, Mo.
Century Indemnity Company	Hartford, Conn.
Columbia Casualty Company	New York, N.Y.
Commercial Casualty Insurance Company	Newark, N. J.
Continental Casualty Company	Chicago, Ill.
Eagle Indemnity Company	New York, N.Y.
Employers' Liability Assurance Corporation, Ltd.	Boston, Mass.
Employers Reinsurance Corporation	Kansas City, Mo.
European General Reinsurance Company, Ltd.	New York, N. Y.
Fidelity and Casualty Company of New York	New York, N. Y.
Fidelity and Deposit Company of Maryland	Baltimore, Md.
Fireman's Fund Indemnity Company	San Francisco, Calif.
First Reinsurance Company of Hartford	Hartford, Conn.
General Accident, Fire & Life Assur. Corp., Ltd.	Philadelphia, Pa.
General Reinsurance Corporation	New York, N. Y.
Glens Falls Indemnity Company	Glens Falls, N. Y.
Globe Indemnity Company	New York, N. Y.
Great American Indemnity Company	New York, N. Y.
Hartford Accident and Indemnity Company	Hartford, Conn.
Hartford Steam Boiler Inspection and Insurance Co.	Hartford, Conn.
Home Indemnity Company	New York, N. Y.
Indemnity Insurance Company of North America	Philadelphia, Pa.
Insurors Indemnity and Insurance Company	Tulsa, Okla.
London Guarantee and Accident Company, Ltd.	New York, N.Y.
London and Lancashire Indemnity Company	Hartford, Conn.
Maryland Casualty Company	Baltimore, Md.
Massachusetts Bonding and Insurance Company	Boston, Mass.
Metropolitan Casualty Insurance Company of New York	Newark, N. J.
National Casualty Company	Detroit, Mich.
National Surety Corporation	New York, N. Y.
New Amsterdam Casualty Company	Baltimore, Md.
New York Casualty Company	New York, N. Y.
Norwich Union Indemnity Company	New York, N. Y.
Ocean Accident and Guarantee Corporation, Ltd.	New York, N. Y.
Oregon Automobile Insurance Company	Portland, Oregon
Pacific Indemnity Company	Los Angeles, Calif.
Phoenix Indemnity Company	New York, N. Y.
Preferred Accident Insurance Company	New York, N. Y.
Royal Indemnity Company	New York, N. Y.
Seaboard Surety Company	New York, N. Y.
Standard Accident Insurance Company	Detroit, Mich.
Standard Surety and Casualty Company of New York	New York, N. Y.
Sun Indemnity Company	New York, N. Y.
Travelers Insurance Company	Hartford, Conn.
Travelers Indemnity Company	Hartford, Conn.
United States Casualty Company	New York, N. Y.
United States Fidelity and Guaranty Company	Baltimore, Md.
United States Guarantee Company	New York, N. Y.
Yorkshire Indemnity Company	New York, N. Y.
Zurich General Accident & Liability Ins. Co., Ltd.	Chicago, Ill.

ASSOCIATION OF CASUALTY AND SURETY EXECUTIVES

MEMBERSHIP

Aetna Casualty and Surety Company	Hartford, Conn.
Aetna Life Insurance Company	Hartford, Conn.
American Automobile Insurance Company	St. Louis, Mo.
American Bonding Company of Baltimore	Baltimore, Md.
American Casualty Company	Reading, Pa.
American Credit & Indemnity Co. of N. Y.	St. Louis, Mo.
American Employers' Insurance Company	Boston, Mass.
American Re-Insurance Company	New York, N. Y.
American Surety Company of New York	New York, N. Y.
Associated Indemnity Corporation	San Francisco, Calif.
Bankers Indemnity Insurance Company	Newark, N. J.
Car and General Insurance Corporation, Ltd.	New York, N. Y.
Central Surety and Insurance Corporation	Kansas City, Mo.
Century Indemnity Company	Hartford, Conn.
Columbia Casualty Company	New York, N.Y.
Commercial Casualty Insurance Company	Newark, N. J.
Continental Casualty Company	Chicago, Ill.
Eagle Indemnity Company	New York, N.Y.
Employers' Liability Assurance Corporation, Ltd.	Boston, Mass.
Employers Reinsurance Corporation	Kansas City, Mo.
European General Reinsurance Company, Ltd.	New York, N. Y.
Fidelity and Casualty Company of New York	New York, N. Y.
Fidelity and Deposit Company of Maryland	Baltimore, Md.
Firemen's Fund Indemnity Company	San Francisco, Calif.
First Reinsurance Company of Hartford	Hartford, Conn.
General Accident, Fire & Life Assur. Corp., Ltd.	Philadelphia, Pa.
General Reinsurance Corporation	New York, N. Y.
Glens Falls Indemnity Company	Glens Falls, N. Y.
Globe Indemnity Company	New York, N. Y.
Great American Indemnity Company	New York, N. Y.
Hartford Accident and Indemnity Company	Hartford, Conn.
Hartford Steam Boiler Inspection and Insurance Co.	Hartford, Conn.
Home Indemnity Company	New York, N. Y.
Indemnity Insurance Company of North America	Philadelphia, Pa.
Insurance Indemnity and Insurance Company	Tulsa, Okla.
London Guarantee and Accident Company, Ltd.	New York, N.Y.
London and Lancashire Indemnity Company	Hartford, Conn.
Maryland Casualty Company	Baltimore, Md.
Massachusetts Bonding and Insurance Company	Boston, Mass.
Metropolitan Casualty Insurance Company of New York	New York, N. Y.
National Casualty Company	Detroit, Mich.
National Surety Corporation	New York, N. Y.
New Amsterdam Casualty Company	Baltimore, Md.
New York Casualty Company	New York, N. Y.
Norwich Union Indemnity Company	New York, N. Y.
Ocean Accident and Guarantee Corporation, Ltd.	New York, N. Y.
Oregon Automobile Insurance Company	Portland, Oregon
Pacific Indemnity Company	Los Angeles, Calif.
Phoenix Indemnity Company	New York, N. Y.
Preferred Accident Insurance Company	New York, N. Y.
Royal Indemnity Company	New York, N. Y.
Seaboard Surety Company	New York, N. Y.
Standard Accident Insurance Company	Detroit, Mich.
Standard Surety and Casualty Company of New York	New York, N. Y.
Sun Indemnity Company	New York, N. Y.
Travelers Insurance Company	Hartford, Conn.
Travelers Indemnity Company	Hartford, Conn.
United States Casualty Company	New York, N. Y.
United States Fidelity and Guaranty Company	Baltimore, Md.
United States Guarantee Company	New York, N. Y.
Yorkshire Indemnity Company	New York, N. Y.
Zurich General Accident & Liability Ins. Co., Ltd.	Chicago, Ill.

TABLE OF CONTENTS

TRAFFIC SAFETY SURVEY OBJECTIVES

FOREWORD

Under the relentless toll of motor vehicle accidents, delays and congestion, communities have come to realize that they must approach their traffic problems realistically and factually. The day has gone when traffic efficiency and security depended on untried and inadequate devices. Today the traffic engineer may not have the final answer to all traffic problems, but he has at his command scientific principles and proven techniques guaranteed to effect at least partial remedy of traffic difficulties.

This Traffic Survey Manual has been prepared as a guide for communities seriously concerned with public safety and wishing to analyze local traffic as the first step toward improvement of the situation. The methods, forms, and procedures recommended are based upon traffic safety surveys made in numerous communities, and represent the experience of leading traffic engineers.

This Manual shows how accident facts, traffic data, enforcement information, and educational activities may be collected, recorded, analyzed and utilized. It is thus a handbook of basic procedures which must precede corrective treatment. It should be supplemented by two other publications issued by the National Conservation Bureau. One is "Traffic Engineering and the Police", which explains in detail how to correct hazardous conditions and apply traffic control devices; the other is "Creating Safer Communities," which presents the set-up of a community traffic safety organization and shows how a traffic survey may be integrated with it.

Fifteen major objectives of a comprehensive and coordinated traffic program that every community will find it profitable to follow are listed on the next page.

A FIFTEEN POINT PROGRAM FOR TRAFFIC CONTROL

ACCIDENT FACTS

1. Adopt a standard accident reporting and record system for police and engineering department use.

EDUCATION

2. Promote adult education in traffic hazards and secure the cooperation of drivers and pedestrians in reducing accidents through the local program.
3. Promote safety education in the elementary schools with emphasis on acquiring the safety attitude.
4. Establish courses of instruction in good driving in the high schools.

ENFORCEMENT

5. Establish a Traffic Division within the Police Department.
6. Abolish the ticket fixing evil through the use of triplicate audited tickets or other systems.
7. Organize and train a Police Accident Investigation Squad.
8. Adopt a program of "selective" law enforcement.
9. Adopt the uniform traffic regulations and municipal ordinances recommended by the National Conference on Street and Highway Safety.
10. Establish a Traffic Court or arrange to have a part of the existing court deal exclusively with traffic violations.

ENGINEERING

11. Locate and eliminate potential hazards created by obstructions to visibility and inadequate street maintenance.
12. Use the uniform signs, signals, street markings and traffic control devices recommended by the National Conference on Street and Highway Safety, or as modified by the State authorities.
13. Make a study of the "worst group" of accident locations and eliminate the hazards by proper means.
14. Improve the efficiency of traffic flow by routing through traffic, by improving street design and by special restrictions governing direction of vehicular movement.

THE FUTURE

15. Set up a permanent safety council or committee to carry on the work that has been started.

GETTING THE SURVEY UNDER WAY.

Survey Origin

Traffic safety surveys have been initiated by the following:

Traffic Engineers.
Traffic Commissions.
Police Departments.
Safety Councils and Committees.
Chambers of Commerce.
Auto Clubs.
Insurance Associations and Agents.
Civic Clubs and Leagues.

Just which agency should preferably be selected will depend upon the local situation in individual communities. For instance, the Safety Council may be in a better position to undertake the survey in one city, the Police Department in another at a given time. It is up to the original broachers of the Survey idea to analyze their community and determine what group would best carry out the Survey.

Survey Financing.

Surveys have been financed by :

City funds alone.
W.P.A. and city funds.
Chambers of Commerce.
Auto Clubs.
Industrial groups.

Safety Surveys may cost from $1,000 to $50,000. The extent of the projects and the type of personnel are the controlling factors. Often much of the help, materials, etc., can be obtained gratis from cooperating agencies. This reduces the cost considerably. In conducting a Survey with W.P.A. funds it is absolutely essential to tie the project in with a city department, such as the Police or Engineering Department or Traffic Commission.

Survey Organization.

A traffic safety survey organization, if operated on a full time basis, should comprise the following minimum personnel:

Director. (A traffic engineer.)
Office Manager.
Statistician.
Field Engineer.
Draftsman.
Clerical Assistants. (one to four)
Field Assistants. (five to thirty)

Office Equipment and Materials.

The minimum office equipment and materials should be :

Desks and chairs.
Typewriters.
Drafting table and drawing materials.
Filing cabinets (Letter size and 5 x 7 card size)
General utility work table.
City Maps - Scale of 500' and 1000' to the inch.
Tracing cloth.
Stencils.
Paper stock (3 x 5 cards, 5 x 7 cards, 8-1/2 x 11, etc.)

Index Cards.
Accident report forms.
Field traffic forms.
Summary traffic forms.
Field boards, clips, and pencils.
Steel tape and stop watches.

Survey Hints.

Any community about to inaugurate a traffic safety survey would do well to consider the following factors:

First. To undertake a survey without the backing of a local safety committee or council is likely to end with the shelving of the recommendations and final report. The survey group can seldom do more than manufacture a product. Some other organization must be on hand to "sell" it. Local safety committees or councils are the organizations best suited to "selling" the recommendations of the traffic safety survey. The organization of a typical community safety committee is composed of four main committees for action: namely Accident Facts, Engineering, Enforcement and Education. For more details about the organization of such a local committee, obtain a copy of "Creating Safer Communities" from the National Conservation Bureau.

Second. A successful survey is a practical one. This means that the proposed suggestions should be within the economic reach of the community. It is then in a position to make improvements as the survey progresses.

Third. The ideal survey is one in which all the major recommendations are put into effect before the final report is written. This is a real measure of the survey's value.

The survey director can do a more effective job if he will not undertake too many studies at once. He will find it advisable to complete in so far as possible each project as he goes, submitting the parts of the Survey in piecemeal fashion. A letter to the Chief of Police, Safety Committee or City Engineer with one or two suggestions at a time, based on facts, will receive far greater attention than if the recommendations are held until the end of the survey and then buried in a large report.

Above all, the survey director should bear in mind that a traffic safety survey should be based upon an accident facts approach.

Fourth. Communities are urged to obtain the services of a traffic consultant to aid in the final analysis of the survey findings if the Survey Director is limited in traffic experience. While this Manual endeavors to explain quite fully how to conduct the survey, it cannot, because of limited space, give all the details of how this material can be applied to the local problem. Information concerning traffic consultation service may be obtained from the Institute of Traffic Engineers or the National Conservation Bureau.

MOTOR VEHICLE ACCIDENT RECORDS.

Accident records furnish the foundation for every traffic safety survey. With proper accident records serving as a guide, the Survey will be in a better position not to waste manpower or do unnecessary work. Accident experience will, if properly followed, point the way in which preventive efforts should be applied.

This part of the Manual aims to furnish a complete factual picture of the community's accident experience. It comprises an accident report form, spot maps, accident location file, monthly accident analysis, and driver accidents and violation record. The adoption and use of a standard accident report form and the preparation of the spots maps, location file, etc., make this initial section of the survey a vital one. It is expected that the report form, spot maps, etc., will be accepted and maintained by the local police department.

If the community already maintains a complete system of accident records, the Survey will have that much of a headstart. However, it should ascertain that the records have been kept properly.

MOTOR VEHICLE ACCIDENT REPORT

(NATIONAL SAFETY COUNCIL FORM)

1934

On E. Front St. at Leland Ave
Street — House No., Intersecting Street, Railroad, Etc.

Date May 1st, 1934 at 5:00 ☐ A.M. ☒ P.M. 1200

VEHICLE No. 1

A Buick Coupe Reg. No. U-2065 going East on E. Front St. at about 25 miles per Hr.
Make and Type of Vehicle — N, SE, Parked, Etc. — Street

Driven by Arthur Martone

Age 29 ☒ Male ☐ Female — Driving Experience 12 Years — Operator's License No. 123456

Address 344 E. Front St, Plfd.

Parts of this Vehicle Damaged Left Side $ 90

Vehicle Owned by Same

VEHICLE No. 2

A Diamond Truck Reg. No. X-3Y-23 N Y going South on Leland Ave. at about 30 miles per Hr.
Make and Type of Vehicle — N, SE, Parked, Etc. — Street

Driven by James Locarno

Age ☒ Male ☐ Female — Driving Experience 7 Years — Operator's License No. 654321

Address 123 Water St., New York City.

Parts of this Vehicle Damaged Right Front. $ 50

Vehicle Owned by Borton Paper Co.

On East Front St. at Leland Ave.

Pedestrian going — W, NE, Etc. — from — NW Corner, S Side, Etc.

Also Involved (Check (X))

- ☐ Vehicle No. 3 (give data on page 3)
- ☐ Fixed object (describe on page 3)
- ☐ Non-collision (turned over, ran off road, man fell from vehicle, etc.; describe on page 3)

Manner of Collision (Collisions of two or more vehicles)

- ☒ 1. Angle collision
- ☐ 2. Head-on collision
- ☐ 3. Rear-end collision
- ☐ 4. Backed into other vehicle
- ☐ 5. Side-swiped other vehicle

2

Names and Addresses of Killed and Injured	Age	Check (X) which
1. Arthur Martone 344 E. Front St.,	29	☒ Male or ☐ Fem. — ☐ Killed or ☒ Inj. — ☐ Ped. or ☐ Pass.
2.		☐ Male or ☐ Fem. — ☐ Killed or ☐ Inj. — ☐ Ped. or ☐ Pass.
3.		☐ Male or ☐ Fem. — ☐ Killed or ☐ Inj. — ☐ Ped. or ☐ Pass.

Injured were taken to Muhlenburg Hospital

Names and Addresses of Witnesses	Age
1. Name / Address	
2. Name / Address	

If arrest was made state:
James Locarno — Passed Stop Sign — Fined $10.00
Name of person arrested — Charge — Disposition

Name of Person Reporting Browne & Bray ☐ Witness ☒ Not Witness

Rank and Number or Address

Report Received by Headquarters

What Drivers Were Doing
Vehicle Check (X) one for each vehicle (1 2 3)

- ☐ ☐ ☐ 1. Making right turn
- ☐ ☐ ☐ 2. Making left turn
- ☐ ☐ ☐ 3. Making U turn
- ☒ ☐ ☐ 4. Going straight ahead
- ☐ ☐ ☐ 5. Slowing down or stopping
- ☐ ☐ ☐ 6. Overtaking
- ☐ ☐ ☐ 7. Leaving curb (incl. backing)
- ☐ ☐ ☐ 8. Other backing
- ☐ ☐ ☐ 9. Stopped in traffic
- ☐ ☐ ☐ 10. Parked

Check (X) also when they apply

- ☐ ☒ ☐ 1. Skidded
- ☐ ☐ ☐ 2. Tire blew out
- ☒ ☐ ☐ 3. Ran off roadway

What Pedestrian Was Doing
Check (X) one item

- ☐ 1. Crossing at intersection with signal
- ☐ 2. Same—against signal
- ☐ 3. " —no signal
- ☐ 4. " —diagonally
- ☐ 5. Crossing—not at intersection
- ☐ 6. Hitching—on vehicle
- ☐ 7. Playing in roadway
- ☐ 8. Walking " "
- ☐ 9. Working " "
- ☐ 10. Waiting for or getting on or off street car at safety zone
- ☐ 11. Same—no safety zone
- ☐ 12. Getting on or off other vehicle
- ☐ 13. Not in roadway

Describe Accident

Car #1 was traveling East on East Front St. and was struck by car #2 which passed a "STOP SIGN."

Car #2 was traveling south on Leland Avenue prior to time of collision.

Driver of car #1 was badly injured.

Both vehicles were badly damaged.

Space above may also be used for data on Veh. No. 3, additional injured, witnesses, etc.

Improper Driving—Check (X) for each vehicle (1 2 3)

- ☐ ☐ ☐ 1. Exceeding speed limit
- ☐ ☐ ☐ 2. Did not have right of way
- ☐ ☐ ☐ 3. Cutting in
- ☐ ☐ ☐ 4. On wrong side of road
- ☐ ☐ ☐ 5. Passing standing street car
- ☐ ☐ ☐ 6. Drove thru safety zone
- ☐ ☐ ☐ 7. Passing on curve or hill
- ☐ ☐ ☐ 8. Failed to signal
- ☐ ☐ ☐ 9. Improper turn—wide right turn
- ☐ ☐ ☐ 10. Same—cut corner on left turn
- ☐ ☐ ☐ 11. " —turned from wrong lane
- ☒ ☐ ☐ 12. Disregarded stop sign
- ☐ ☐ ☐ 13. " signal
- ☐ ☐ ☐ 14. Other improper driving, explain opposite
- ☒ ☐ ☐ 15. No improper driving

Explain others below

Condition of Vehicles
Vehicle Check (X) for each vehicle (1 2 3)

- ☐ ☐ ☐ 1. Defective brakes
- ☐ ☐ ☐ 2. Improper lights
- ☐ ☐ ☐ 3. Defective steering gear
- ☐ ☐ ☐ 4. Other defects as follows:
- ☒☒ ☐ 5. No defects apparent

Traffic Control
Check (X) which

Functioning / Not Functioning

- ☒ At street intersection
- ☐ At railroad crossing
- ☐ Elsewhere

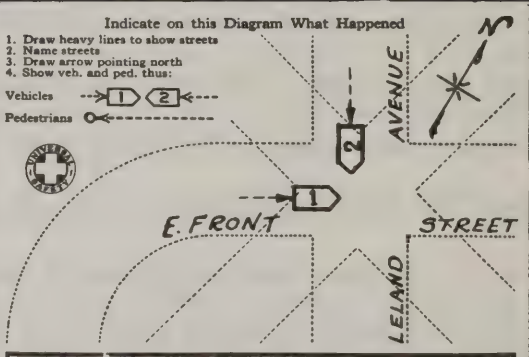
- ☐ ☐ 1. Railroad crossing gates
- ☐ ☐ 2. Officer or watchman
- ☐ ☐ 3. Automatic signal
- ☒ ☐ 4. STOP signs
- ☐ ☐ 5. Warning signs; SLOW, etc.
- ☐ 6. No control present

3

Indicate on this Diagram What Happened

1. Draw heavy lines to show streets
2. Name streets
3. Draw arrow pointing north
4. Show veh. and ped. thus:

Vehicles --> 1 2 <---
Pedestrians O<----------



Condition of Drivers
Vehicle Check (X) for each driver (1 2 3)

- ☐ ☐ ☐ 1. Under influence of liquor
- ☐ ☐ ☐ 2. Physical defect (Eyesight, etc.)
- ☐ ☐ ☐ 3. Other handicaps, as follows:
- ☒☒ ☐ 4. Driver apparently normal

Condition of Pedestrians
Check (X) which

- ☐ 1. Under influence of liquor
- ☐ 2. Physical defect (Eyesight, etc.)
- ☐ 3. Other handicaps, as follows:
- ☐ 4. Pedestrian apparently normal

Road Condition
Check (X) one

- ☐ 1. Road under repair
- ☐ 2. Obstruction not lighted
- ☐ 3. Other defects
- ☒ 4. No defect

Road Surface
Check (X) one

- ☒ 1. Dry
- ☐ 2. Wet / Snowy / Icy

Weather
Check (X) one

- ☒ 1. Clear
- ☐ 2. Cloudy / Fog / Raining / Snowing

Light Check (X) one

- ☒ 1. Daylight
- ☐ 2. Dusk or semi-darkness
- ☐ 3. Darkness—street lights
- ☐ 4. " —no street lights

4

MOTOR VEHICLE ACCIDENT REPORT

The accident report shown on the opposite page is being used by numerous police departments throughout the country. It has been designed to furnish a maximum amount of information. The form can be printed locally or purchased in quantity lots from the National Safety Council. While it is not absolutely necessary that this form be used, it is important that the survey set an example for the local officials wherever possible. Another very excellent form has been developed by the Safety Division, International Association of Chiefs of Police, 1827 Orrington Avenue, Evanston, Illinois. This form is especially adapted to accident investigation squad work. While it is quite similar to the one illustrated here, it permits additional information to be recorded on certain phases of the investigation and prosecution. The use, therefore, of one of these two report forms is urged.

Accident records for the last three calendar years should be placed on one of these two forms. When transferring the facts on to this form, emphasis must be placed on the careful recording of the exact location, direction of car movement, date and time of accident and attendant circumstances, since they are highly important to Office Project #3. The reports are filed by location, as explained later in this Manual.

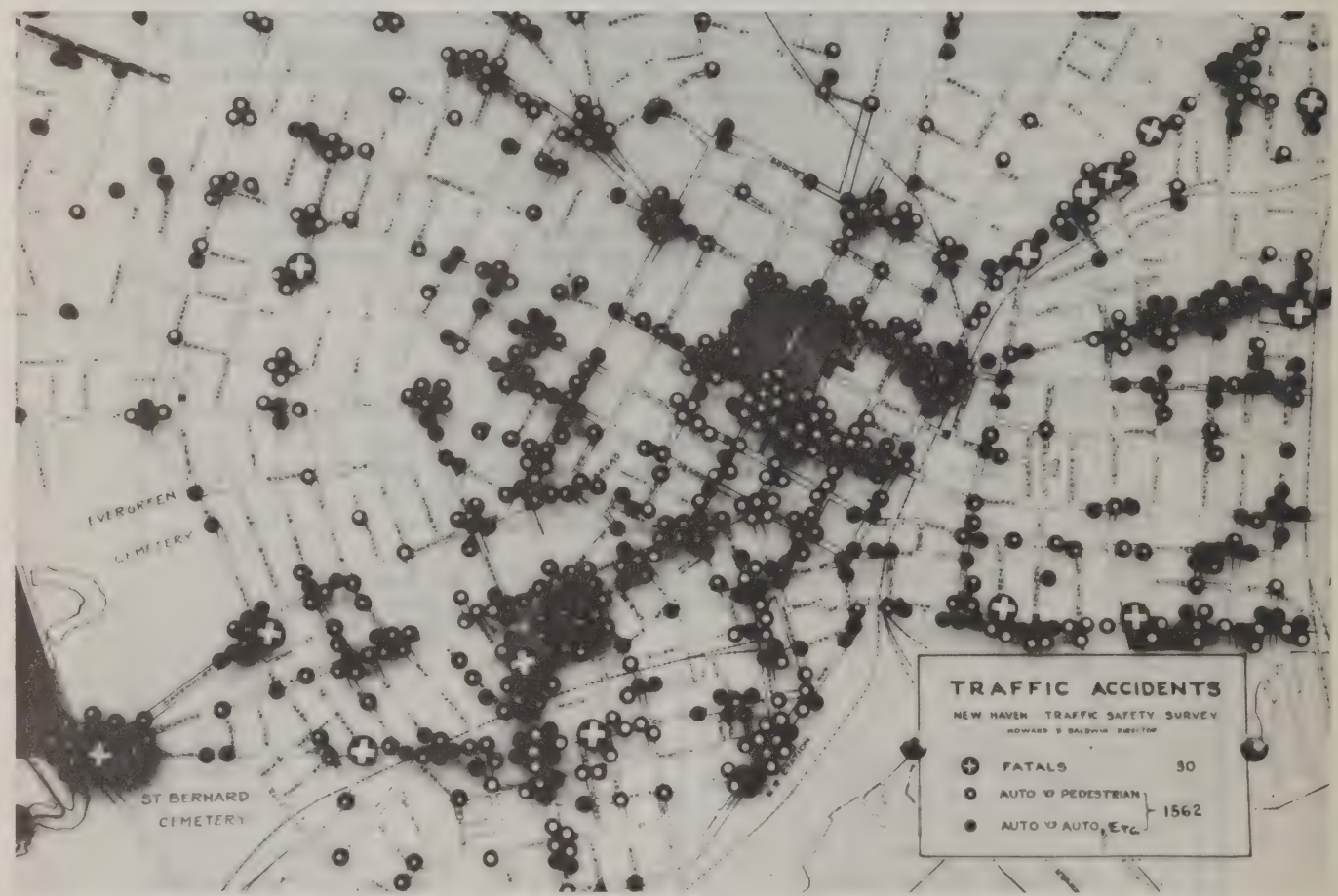
Uses

1. The reports are the raw material from which the four safety tools are prepared; namely the spot maps, accident location file, monthly analysis, and driver accident and violation record file.

2. They furnish the police department with the basis for a standard accident reporting and recording system.

ACCIDENT LOCATION SPOT MAP.

SAFETY TOOL NO. 1



SPOT MAPS

Accident Location Spot Map. This map, through the use of variously shaped or colored pins, presents a visual record of the motor vehicle accidents in the community. It shows at a glance the "worst" corners, streets and sections in the community. Classification as to types of accidents to be illustrated fall into three natural divisions:

All motor vehicle, except pedestrian = ● Black pin.

Motor vehicle collisions with pedestrian = ⊙ Black pin with white center.

Fatal accidents involving only motorists = ⊕ White cross on black pin.

Fatal accidents to pedestrians = ⊕ Black cross on white pin.

For best display purposes the map should be large. A scale of 400 to 600 feet to the inch is recommended. Such a map can usually be obtained from the office of the city engineer or street department.

The map should be mounted on some form of composition material and framed. The finished map might be displayed on a small easel.

Normally, a one-year accident record is all that should be placed on the map. Obviously, this should be the most recent calendar year. If time permits, a separate spot map may be prepared for each of the three years being studied. For small communities a composite spot map showing the three year record may be prepared.

Pedestrian Accident Spot Map. A medium-sized spot map should be prepared showing where the day and night pedestrian accidents occurred. Two types of pins are necessary. To save time and handling of accident reports this map should be prepared at the same time pedestrian accidents are spotted on the large Accident Location Spot Map.

Fatal Accident Location Spot Map. Another spot map, designed primarily for publicity and educational purposes, is one showing the location of fatal accidents for a five-year period. This does not require a large mounted street map, nor does it require much time to prepare. Usually a small 8-1/2 x 11 skeleton street map of the city, with black dots showing the location of each fatal mishap, is sufficient. A distinction should be made between pedestrian and occupant fatalities. An example is shown on page 18 .

Driver and Pedestrian Residence Spot Map. Special attention should be given to the preparation of a spot map which will show at a glance the districts in which the majority of local drivers and pedestrians reside who are involved in accidents. Two types of pins are necessary.

Often this map will show sections of the community where special safety educational activities can be effectively applied. The type of map used for this study is similar to that used for the accident spot map, but need not be as large.

Night Accident Location Spot Maps. Show general injury accidents only. One year record.

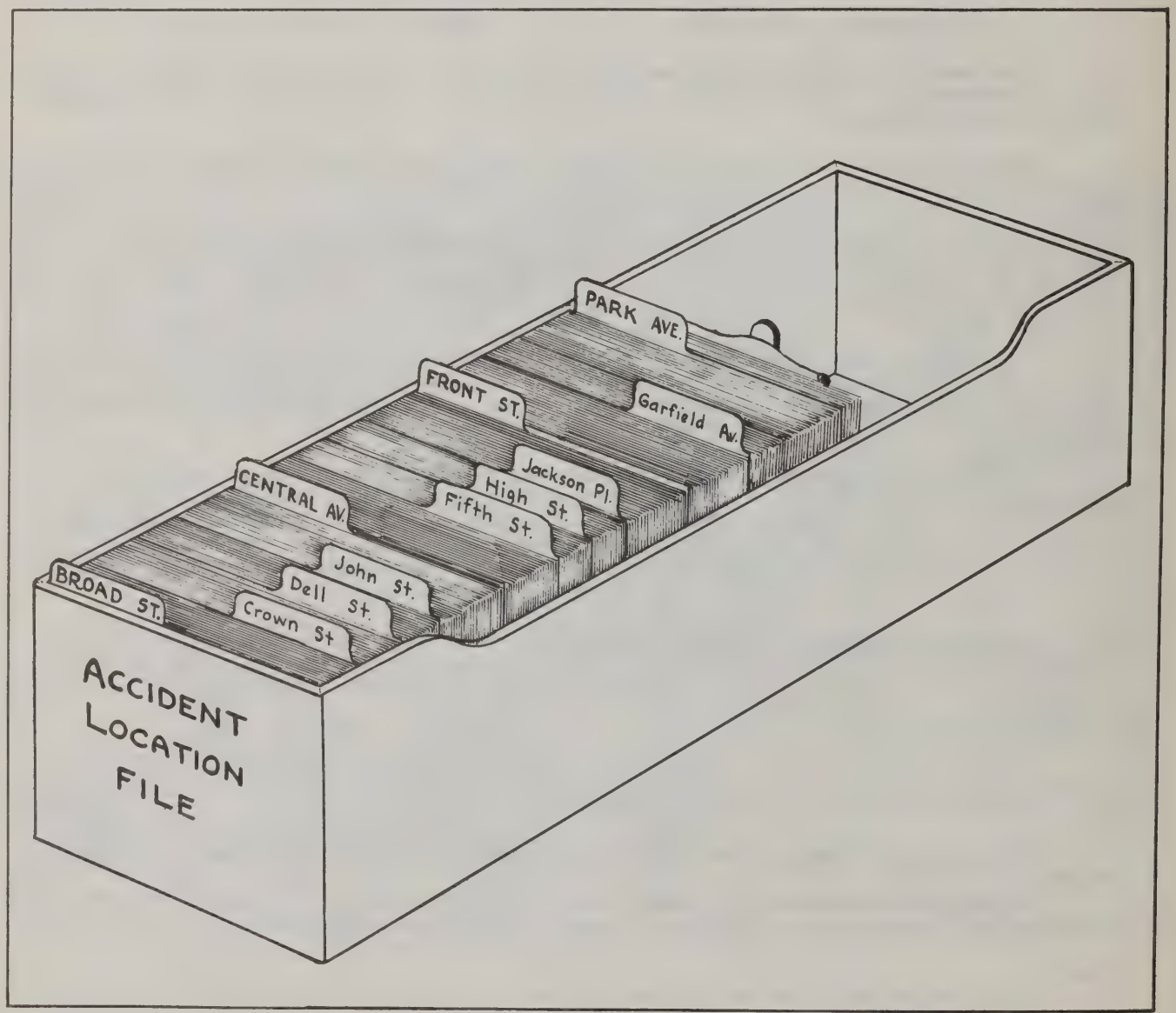
Child Accident Location Spot Maps. One to three year record. Prepared to show relation of child accidents to location of school districts and playgrounds.

Uses

1. The accident location spot map presents a visual record of "worst" corners, streets and sections in the community.
2. The fatal accident location spot map impressively depicts where the accidents occurred in which people were killed.
3. Both are used largely for display purposes and by speakers on the subject of safety.
4. The residence spot map is used to show where safety education is most needed.
5. The pedestrian accident spot map showing where the day and night accidents occur is valuable to the street lighting study and for educational purposes.
6. The spot maps should be given to the police department or traffic engineering office at the conclusion of the survey. It is expected that the maps will be kept up to date.

ACCIDENT LOCATION FILE

SAFETY TOOL NO. 2



ACCIDENT LOCATION FILE

Detailed records of motor vehicle accidents by location are maintained through the use of the accident location file. The accident reports explained on a previous page are filed alphabetically by intersection or street.

Accidents occurring at intersections are filed under the name of the street coming first alphabetically and behind the name of the intersecting street. For example: a report card for an accident at Ames and Davis would be filed in the section under primary card Ames and behind the Davis guide cards.

Reports for accidents occurring between intersections are filed under the intersections nearest to the place where the accident took place. (National Safety Council's Memo No. 40 contains a detailed description.)

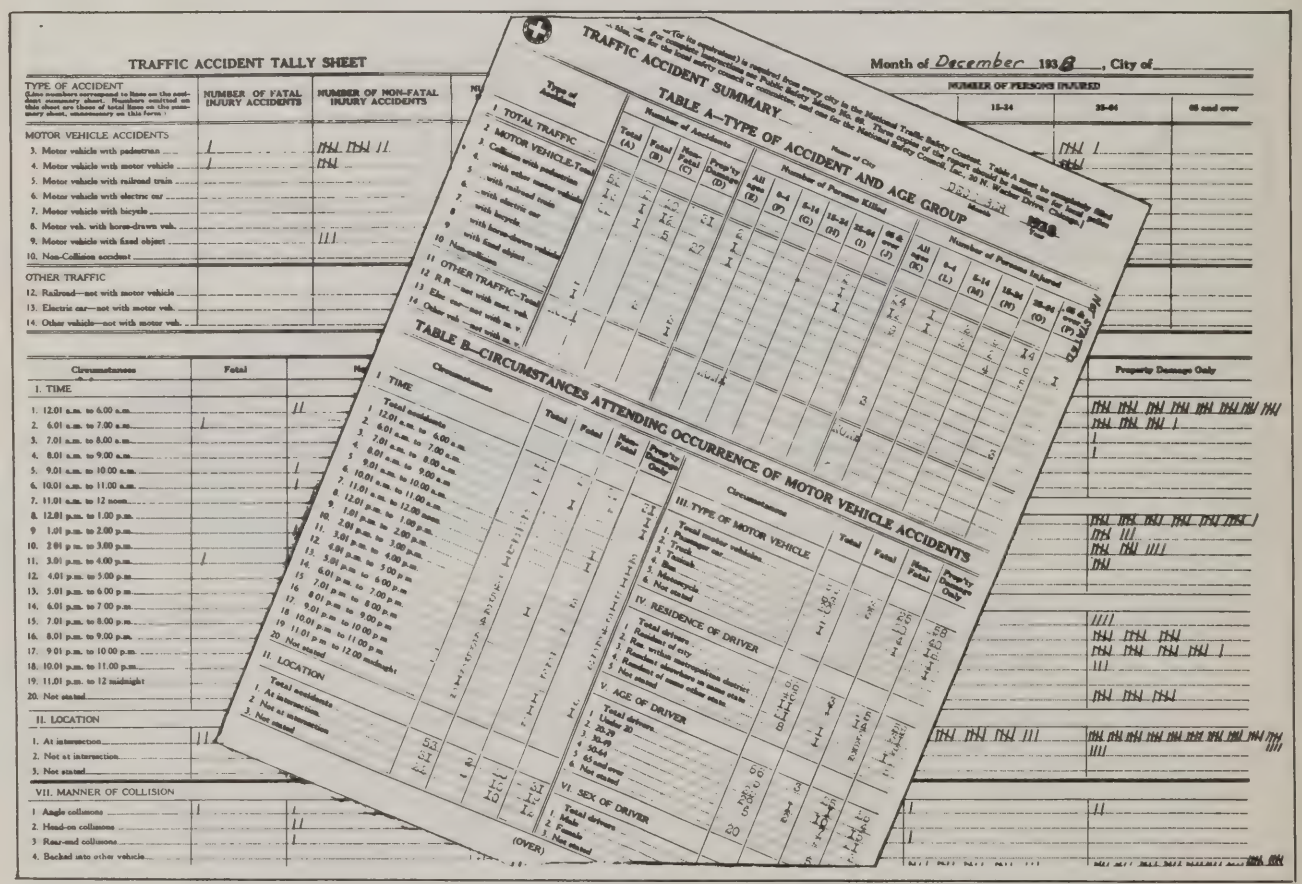
This file should be carefully prepared since it will be passed on to the police department or some other official organization to maintain at the conclusion of the survey. The index cards are usually 5 x 8 inches in size.

Uses

1. The Accident Location File furnishes quick and complete accident information about the accidents at any location or on any street.
2. Reveals "worst" corners and detailed accident facts about each.
3. Is an important tool in the construction of collision diagrams, and of material assistance to all traffic engineering studies.
4. Aids police in the preparation of selective law enforcement programs.

MOTOR VEHICLE ACCIDENT ANALYSIS

SAFETY TOOL NO. 3



MOTOR VEHICLE ACCIDENT ANALYSIS

A monthly and annual breakdown of the community's accident experience is of utmost importance. This can best be obtained through the use of a standard accident analysis form such as the one prepared by the National Safety Council and used in hundreds of communities. It provides a ready cross-section of the citywide accident experience in these groups - fatal, personal injury and property damage.

The large yellow tally sheet (half shown on opposite page) and blue summary sheet (shown as overlay on tally sheet) can be obtained from the Council upon request. Since the accident records for the last three calendar years should be entered by months on these forms, thirty-six yellow tally sheets are needed and forty blue summary sheets. This will provide for monthly and annual summaries as well as a three year recapitulation. The accident report is the source of data for this analysis.

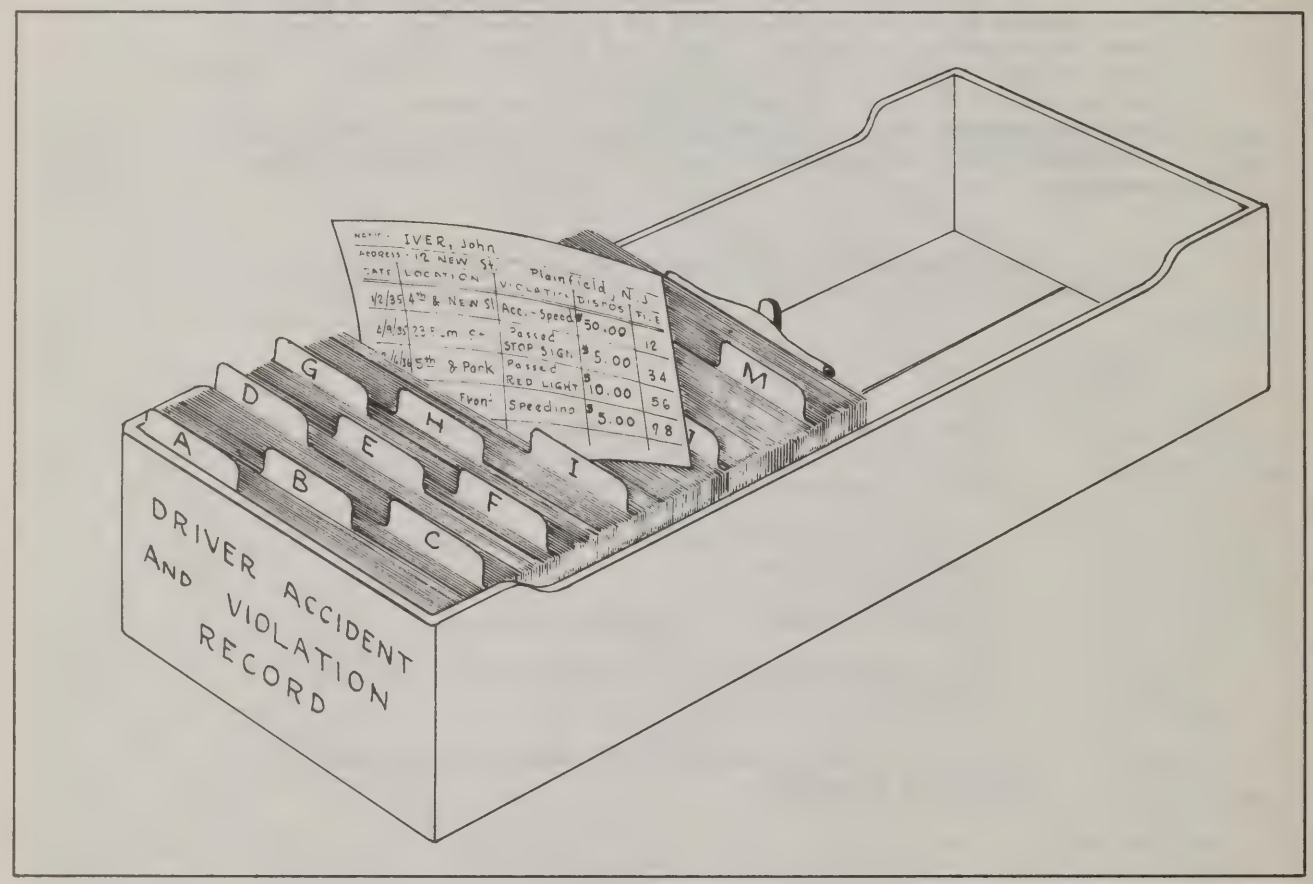
Safety Memo #69 of the National Safety Council explains the use of this form in detail.

Uses.

1. This analysis reveals many facts about the local accident problem that are valuable to the police, schools, and safety committee.
2. Source of data for preparing most of the accident charts and graphs.
3. Serves as a guide to the survey procedure.
4. Provides good material for newspaper publicity and speakers.
5. Should be maintained by police department at conclusion of survey.

DRIVER ACCIDENT AND VIOLATION RECORD FILE

SAFETY TOOL NO. 4



DRIVER ACCIDENT AND VIOLATION RECORD FILE

The driver accident and violation record file is used primarily to locate and treat those operators who are constantly having accidents and committing violations. It also shows, in part, the quality of the local law-enforcement program.

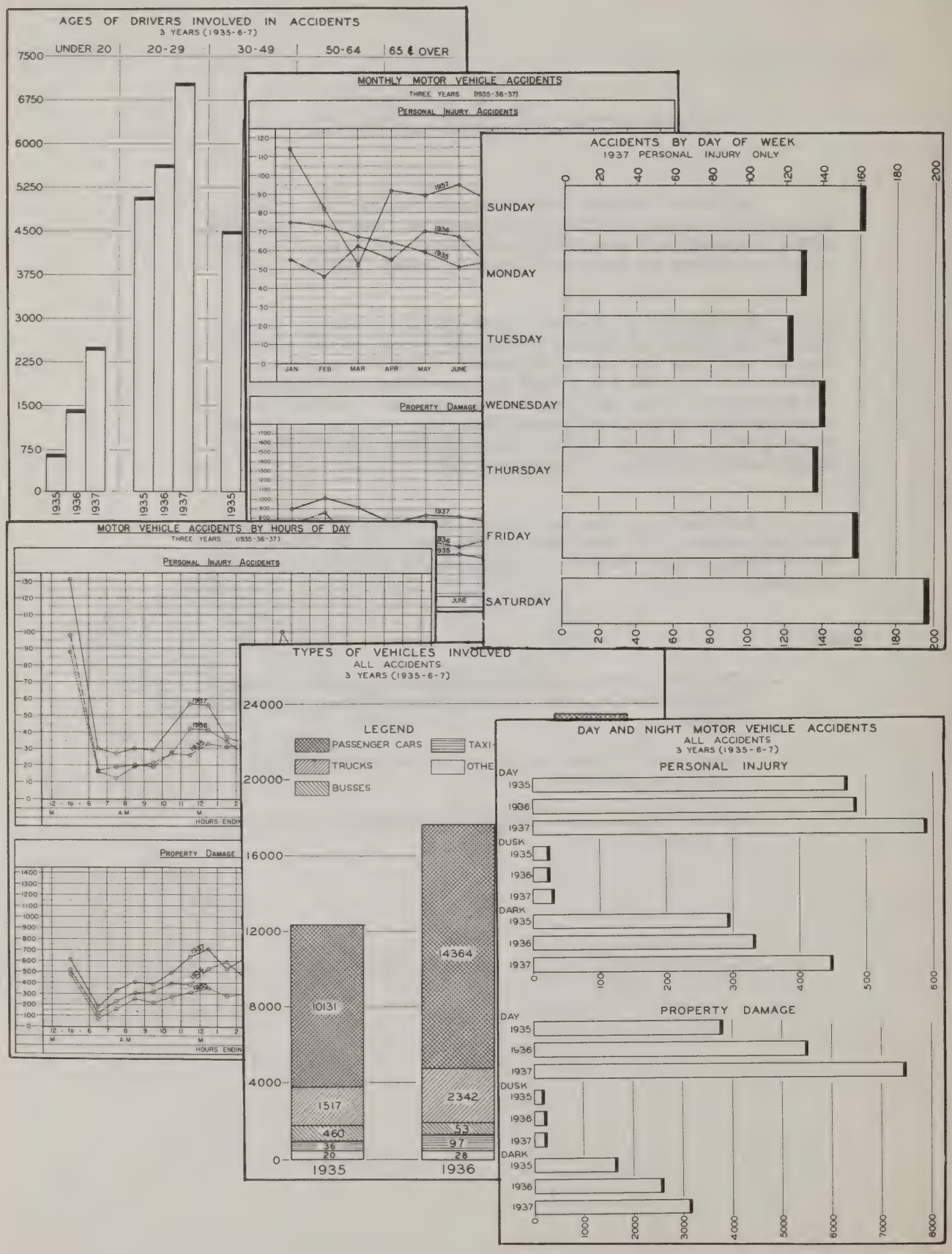
The file is maintained alphabetically according to the name of operators and carries a complete record of all motor vehicle accidents and moving violations. The information is entered on a 3 x 5 or 4 x 6 card and shows the name, address and license number of operator as well as date, location and classification of accident or violation and the action, if any, taken by the police or court. Police warnings for violations should also be recorded. However, parking violations are omitted.

The source of data for this file is derived (1) from the accident reports, (2) the court records, and (3) the State Motor Vehicle Department. Experience covering the last three years is recorded.

Uses.

1. This file reveals to Safety Committee, Police and Motor Vehicle Commissioner the accident and violation prone drivers.
2. Shows action taken by the police and court regarding individual motorists.
3. Should be maintained by police department at conclusion of survey.

OFFICE PROJECT #2 — ACCIDENT FACTS



MOTOR VEHICLE ACCIDENT FACTS

Accident facts are derived from the accident records. Accident facts help to emphasize the value of the survey to municipal officials and the safety committee, and have other important uses, as listed below.*

How the Engineer Uses Accident Facts.

1. To locate and correct physical conditions at intersections, street and other locations where accidents are occurring most frequently.
2. To determine the "worst" locations from the point of view of accident severity.
3. To justify action, either positive or negative, on demand for signs, signals, or other traffic control equipment, and to give force to recommendations for improvement in street design at proper locations.
4. To evaluate the necessity for throughways or measure the value of existing ones.
5. To route through traffic safely through or around the city.
6. To show where various kinds of traffic should be restricted or eliminated.
7. To aid in developing proper one-way streets.
8. To locate and remove dangerous parking practices.
9. To determine the relation of speed to accidents at specific locations.
10. To assist in the preparation of collision diagrams.
11. To make "before and after" studies where improvements have been made. Such studies are the only real yardstick for measuring the value of signs, signals, street markings, island, street illumination, etc.

How the Police Use Accident Facts.

1. To develop a workable selective law enforcement program.
2. To determine and justify the size, nature and scope of staff and equipment assignments for traffic control work.
3. To evaluate such work in a good enforcement index.
4. To develop proof of negligent operation against drivers in accidents.
5. To establish proper locations for mechanical control devices provided such work is under the Department's jurisdiction.
6. To engage in educational activities.
7. To provide information to the public.
8. To develop better traffic regulations and local ordinances.

How the Education Committee Uses Accident Facts.

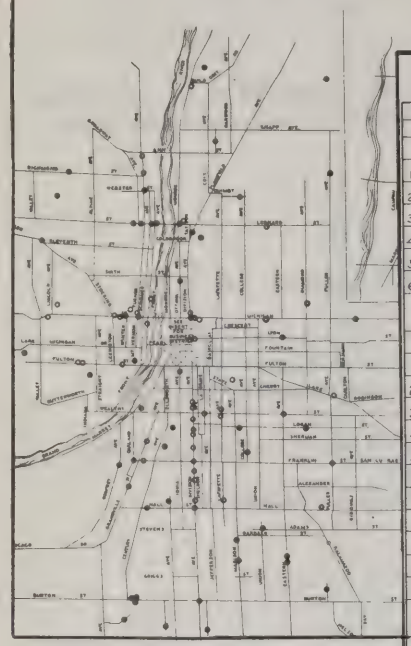
1. To dramatize accident facts through the preparation of interesting analyses, charts, posters, or other devices emphasizing local conditions.
2. To focus public attention on specific hazards.
3. To develop proper publicity; posters, talks, radio, etc., designed to encourage the removal of physical hazards and to discourage bad driving practices.
4. To mobilize public support for activities conducted by engineers and police.
5. To report progress of Citizens' or Mayor's Committee work.
6. To justify expenditures for educational facilities.
7. To help the schools organize curriculum studies emphasizing the local situation.

---

* From "Creating Safer Communities", pp. 12-13.

OFFICE PROJECT #2 – ACCIDENT FACTS

MOTOR VEHICLE FATAL ACCIDENTS
FIVE YEARS (1933-1937)



CLASSIFICATION OF ACCIDENTS
All Accidents
3 Years (1935-6-7)

CIRCUMSTANCES	1935	1936	1937	TOTAL
MANNER OF COLLISION				
Total 2 Vehicle Accidents	5852			
1. Angle Collisions	2074			
2. Head-on Collisions	157			
3. Rear end Collisions	1411			
4. Backed into other Vehicle	420			
5. Side-swiped other Vehicle	1790			
6. Not stated				
WHAT DRIVERS WERE DOING				
Total Motor Vehicles	12164			
1. Making right turn	694			
2. Making left turn	1004			
3. Making U turn	155			
4. Going straight ahead	5917			
5. Slowing down or stopping	784			
6. Overtaking	928			
7. Leaving curb (including backing)	590			
8. Other backing	414			
9. Stopped in traffic	801			
10. Parked	877			
11. Not stated				
MISCELLANEOUS EVENTS				
Total (of following 3 items)	2011			
1. Skidding	1910			
2. Blow-out	2			
3. Ran off roadway	99			

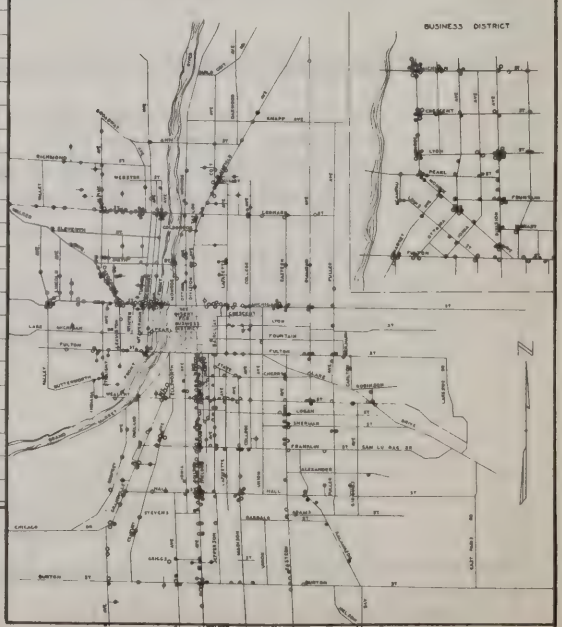
FIFTY WORST ACCIDENT INTERSECTIONS
1937 - ALL TYPES OF ACCIDENTS

CHILD ACCIDENTS
THEIR RELATION TO LOCATION OF SCHOOLS & PLAYGROUNDS
1937 ACCIDENTS • • 0-15 YEARS

25 WORST PEDESTRIAN ACCIDENT INTERSECTIONS
1937 ONLY

	NAME OR LOCATION	TOTAL NO OF ACCIDENTS
1.	Michigan and Monroe	
2	Michigan and Front	
3	Leonard and Front	
4	Division and Hall	
5	Monroe and Pearl	
6	Monroe and Ottawa	
7	Division and Fountain	
8	Leonard and Hamilton	
9	Division and Wealthy	
10	Bridge and Front	
11	Bridge and Stocking	
12	Plainfield and Coit	
13	Monroe and Crescent	
14	Division and Lyon	
15	Fulton and Front	
16	Bridge and Valley	
17	Leonard and Alpine	
18	Michigan and Harland	
19	Monroe and Lyon	
20	Fulton and Park	
21	Wealthy and Diamond	
22.	Bridge and Turner	
23	Division and Franklin	
24	Division and Burton	
25	Fulton and Market	

DAY & NIGHT PEDESTRIAN ACCIDENTS
1937 ACCIDENTS • • ALL AGES



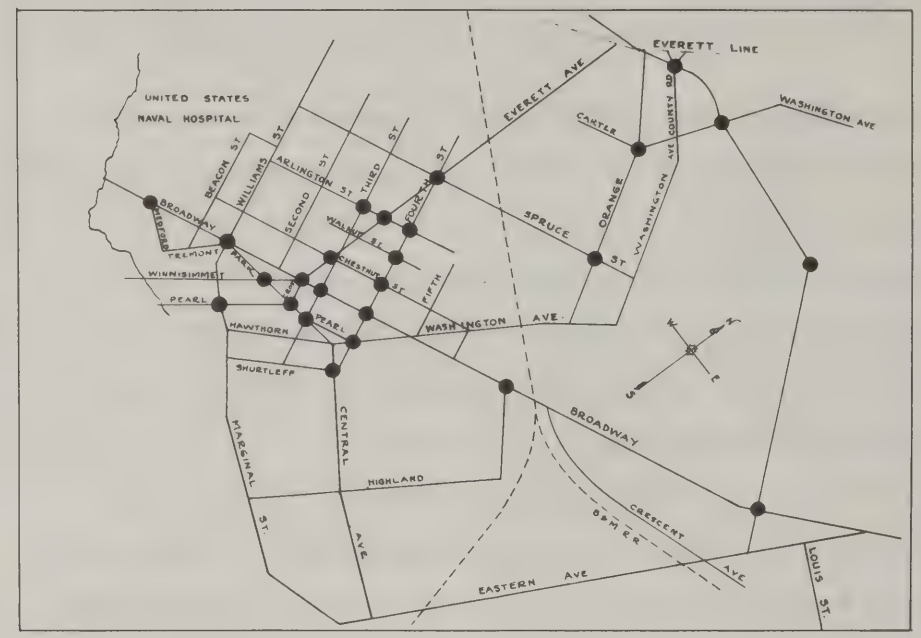
ACCIDENT FACTS SUMMARIES

To make the accident records, Office Project #1, effective they must be summarized and shown in table, chart or map form. Certain of the accident records, such as spot maps, are already in this form. With each of the maps, however, should be a brief summary of the highlights shown by the maps.

Some of the more important accident fact summaries are as follows -

1. Accident Location Spot Map. (Shows all types of accidents) (One year)
2. Pedestrian Accident Spot Map. (Day and night) (One year)
3. Fatal Accident Location Spot Map. (Five year period)
4. Driver and Pedestrian Residence Spot Map. (One year only)
5. Night Accident Location Spot Map. (Personal Injury) (One year)
6. Child Accident Location Spot Map. (One year)
7. Table of trend and number of types of accidents. (Three years)
8. Table of monthly injury and property damage accidents. (Three years)
9. Table of hourly injury and property damage accidents. (Three years)
10. Table of hourly personal and property damage accidents as compared to motor vehicle volume. (Three years)
11. Table of accidents at and between intersections. (Three years) (Tie in with Office Project #1)
12. Table of types of collisions and actions of drivers. (Three years)
13. Table of residence of drivers involved in accidents. (Three years) (Tie in with Office Project #4)
14. Table of day and night accidents. (Three years) (Tie in with Office Projects #2 and #5)
15. Table of type of motor vehicles involved. (Three years)
16. Table of ages of drivers involved. (Three years)
17. Table of injury accidents by days or weeks. (One year)
18. Table showing ages and accidents of pedestrians injured, also table of population by same age groupings. (Three years) (Tie in with Office Project #2)
19. List of worst accident corners in order of severity. (One year)
20. Spot map of 50 worst corners. (One year)
21. Table of five worst accident streets. (One year)

"WORST" ACCIDENT INTERSECTION



COMPOSITE ANALYSIS

WORST ACCIDENT INTERSECTIONS

Date_____ Source of Data _____

List No.	LOCATION	YEAR of 19... M.V. vs. M.V.	YEAR of 19... M.V. vs. Ped.	YEAR of 19... other	YEAR of 19... Total	YEAR of 19... M.V. vs. M.V.	YEAR of 19... M.V. vs. Ped.	YEAR of 19... other	YEAR of 19... Total	YEAR of 19... M.V. vs. M.V.	YEAR of 19... M.V. vs. Ped.	YEAR of 19... other	YEAR of 19... Total	TOTAL 6 years M.V. vs. M.V.	TOTAL 6 years M.V. vs. Ped.	TOTAL 6 years other	TOTAL 6 years Total	Acc. Per 1000 veh.
	TOTAL																	

"WORST" ACCIDENT INTERSECTIONS AND STREETS

The spot map and accident location file, explained in Office Project #1, reveal the worst accident locations. These high accident locations are the "sore spots" in the community and form the nucleus around which the traffic engineering studies are built. But before considering each of these worst locations individually, a composite picture is necessary. With the aid of such a picture, many valuable facts are revealed which relate to the worst corners as a whole. These are important not only to engineering but to enforcement and education.

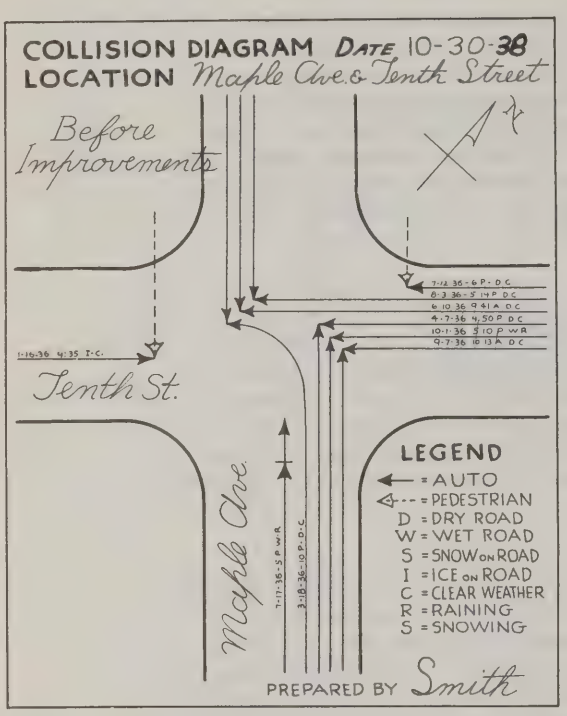
Worst Accident Intersections: The first two important aids in showing this composite picture from a worst corner angle are illustrated on the opposite page. The skeleton maps show the 25 "worst" intersections and the table lists the intersections in the order of their accident frequency. A column has also been inserted at the extreme right in which the number of accidents per 1,000 vehicles per day can be recorded. This can be filled in as soon as the motor vehicle volume counts at the worst corners are made.

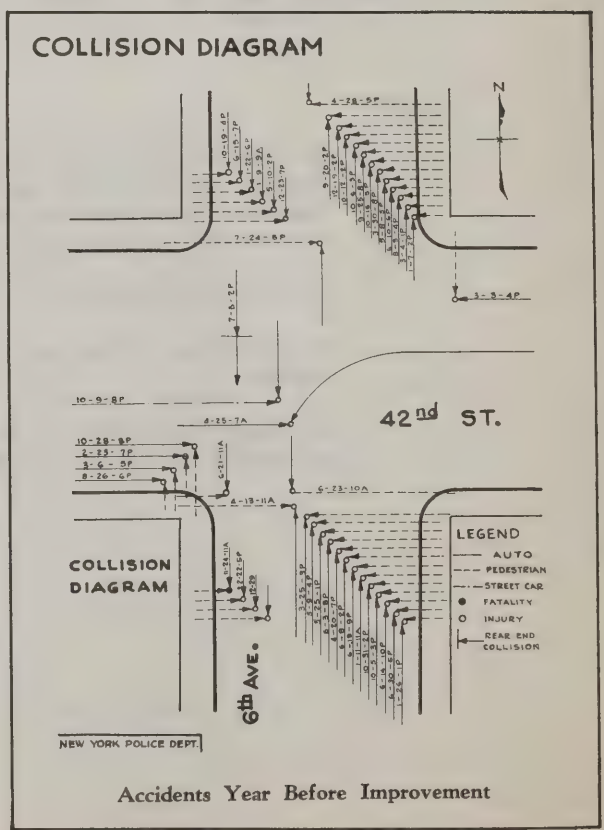
Worst Accident Streets: A composite of the five worst accident streets can be shown in a similar manner as that described for the worst accident intersections. The accident facts are taken from the spot map and location file. A skeleton map should be prepared, showing with heavy lines the five worst accident streets. Likewise a table should be prepared showing the number of motor vehicle and pedestrian accidents for each street.

Uses:

1. To show the relative severity and frequency of motor vehicle accidents at the worst corners. Also to show the relative number of accidents per 1,000 vehicles per day at the respective corners.
2. To show the streets requiring special attention.
3. To guide the survey and indicate where first emphasis is needed.
4. To impress and educate the community regarding the worst accident corners and streets.

COLLISION DIAGRAMS





INVESTIGATING ACCIDENT-PRONE LOCATIONS

The accident-prone intersection is one where accidents are frequent. While its own accident experience is related to conditions on neighboring streets and at neighboring intersections, and while it must be studied in relation to such locations, an accident-prone intersection must also be studied as an individual problem. It should be scrutinized for its peculiarities. In studying an intersection the first steps are to prepare collision and condition diagrams.

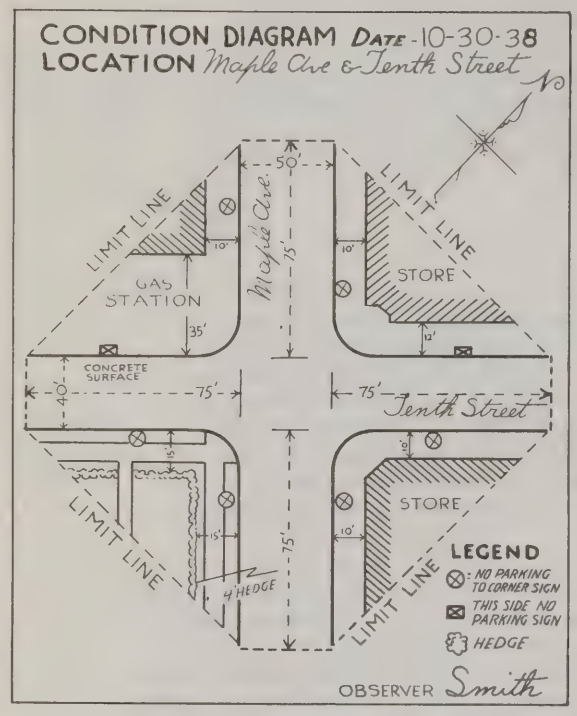
Collision Diagrams.

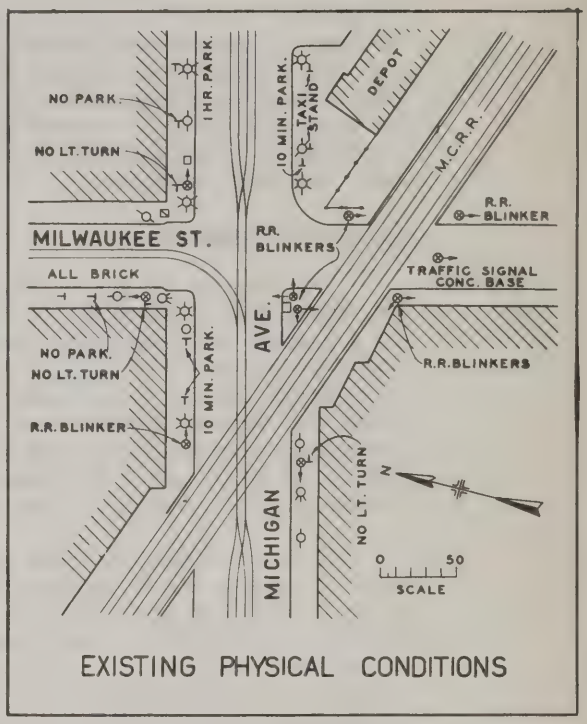
The purpose of the collision diagram is to show the types of accidents occurring (i.e. right-angle, rear-end, turning, etc.) in a graphic and revealing manner. The necessary tools are the accident reports (see page 6 covering as long a period as possible, preferably two to three years. Make sure that no physical changes have been made or traffic control devices added or removed at the intersection during the period. The sketch of the intersection, placed on an 8-1/2" x 11" sheet of paper, is made large enough to assure plenty of room to draw arrows. It need not be drawn to scale.

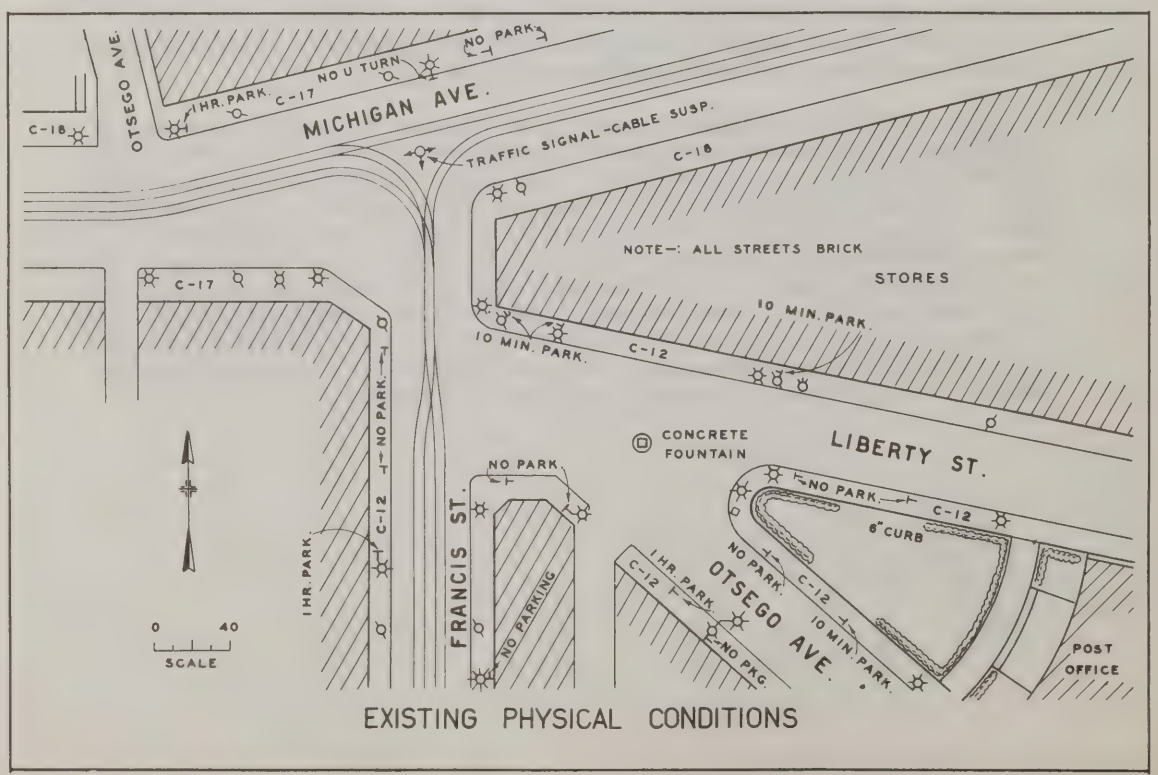
If the accident reports are properly prepared, each will contain a small sketch and a brief notation describing how each accident occured. It will describe the direction in which the vehicles and pedestrians involved were traveling just before each collision took place. Each of these accidents is plotted on the intersection sketch, as illustrated at left. Each accident is indicated by arrows which show the direction of movement of the vehicle or pedestrian involved. The exact spot of the accident need not be indicated. Each vehicle is represented by a solid line and each pedestrian by a dotted line. This composite diagram of the accidents on the intersection sketch is a Collision Diagram. Other facts which should be included on the diagram are: the date, hour, weather condition and road surface condition.

The Collision Diagram reveals the nature of accident experience at a given point. It may show most of the accidents falling into one or more of the following classifications: (1) between vehicles entering from the two approaches forming one corner of the intersection (usually right-angle collisions); (2) involving left or right turning vehicles; (3) rear-end collisions; (4) between vehicles entering from only one street; (5) involving pedestrians and one crosswalk; (6) collisions between vehicles and fixed objects. These and many other accident combinations give definite clues to the reasons why accidents occur. The Collision Diagram may also reveal certain months, days and hours when accidents tend to occur. It also shows the part played by the weather.

CONDITION DIAGRAMS







Condition Diagrams.

While the collision diagrams are being prepared, the condition diagrams can also be prepared. One must be prepared for each of the accident prone intersections, as supplements to the collision diagrams.

The condition diagram gives an accurate picture of the physical conditions at the location studied. Usually a rough sketch of the location is prepared in the field. From this sketch a diagram can later be drawn to scale. If the diagram is placed on an 8-1/2" x 11" sheet, a scale of 32 feet per inch is recommended. The observations and measurements which should be noted at the location when preparing a rough condition diagram include the following:

1. Street widths (curb to curb).

2. Measurement of the distances from curb lines to all obstructions to vision existing within 75 feet of the location. Such obstructions should be measured at the eye level of drivers. Cars commonly parked near the intersection constitute obstructions to vision.

3. Placement and type of all signs, traffic signals, street markings and islands at or near the location.

4. Type, grade and any unusual condition of road surface, street car tracks, etc.

5. Position and amount of street lighting.

6. Conditions and visibility of all signs at or near the location.

Combined Diagrams.

The matter of combining the collision and condition diagrams is one of individual choice. If the combination will not be too complex or complicated, it is suggested that the two be brought together. This will, however, require the composite diagram to be drawn to a larger scale.

Uses.

The uses of collision and condition diagrams have been combined and are shown in conjunction with the summary analysis presented on the next page.

SUMMARY ANALYSIS

COLLISION DIAGRAM

Location Maple Avenue and Tenth Street

NUMBER & SEVERITY OF ACCIDENTS

	ACCIDENTS	FATAL	INJURY	PROP. DAMAGE
M.V. Collisions	7	—	6	1
M.V.—Ped. Collision	2	—	2	—
M.V.—Fixed object	—	—	—	—
Others	—	—	—	—
TOTAL	9	—	8	1

WHAT DRIVERS & PEDESTRIANS WERE DOING

MOTOR VEHICLE COLLISIONS	
Right Angle	5
Left Turn	1
Right Turn	—
Head on	—
Rear End	1
Other	7

M.V. vs. PEDESTRIAN COLLISIONS	
Children (0-4)	
Children (5-14)	1
Adult (15-over)	1
At near Crosswalk	2
At far Crosswalk	
Left Turn Vehicle	
Right Turn Vehicle	
Reversing Vehicle	

TRAFFIC CONTROL

Traffic Signals	
Stop Signs	
Police Officer	
Other	
Accidents one year before control	9 in first 10 months
Accidents one year after control	

ATTENDING CIRCUMSTANCES

		M.V. vs. M.V.	M.V. - PED.	FIXED OBJECT	OTHER	TOTAL
SEASON-TIME	DAY	5	2			7
	DUSK	1	—			1
	DARK	1	—			1
	SPRING	1	—			2
	SUMMER	3	1			4
	FALL	2	—			2
	WINTER	0	1			1
ROAD SURFACE	DRY	5	1			6
	WET	2	—			2
	SNOW	—	—			
	ICE	—	1			1

Date 10/30/38 Recorder Smith

N. C. B.' No. 16

"WORST" LOCATION SUMMARY ANALYSIS

The next step to the study of each "worst" location or accident-prone intersection is a summary analysis of the accident facts. The need for a summary analysis becomes more apparent as the accident details on the collision diagram becomes more numerous. A summary analysis form is shown on the opposite page. All those facts have been included which will be helpful to the study of the individual intersection and to the composite intersection studies presented in the preceding pages. The facts shown on this form are taken from the same individual accident reports that were used in preparing the collision diagrams.

Once the summary analysis has been prepared, it is suggested that all outstanding facts be circled with a colored crayon to aid in future references.

Equipped with this summary analysis, and the collision and condition diagrams, the survey is ready to expand its activities. Viewing these three studies as a whole will reveal many uses. Here are a few of the most important ones:

Uses:

1. To reveal common denominators of accidents.
2. To point to definite ways that accidents can be eliminated.
3. To offset impractical remedial suggestions made by the public.
4. To reveal possible relationships between types of accidents and physical conditions at intersections.
5. To indicate where stop sign and traffic signal studies will be most beneficial.
6. To show where speed, parking and street lighting studies are important.
7. To point out where pedestrian studies are necessary,
8. To show where volume counts are needed first.
9. To justify certain recommendations which necessitate large expenditures or marked changes in the physical design of street layout.
10. To aid the police in making enforcement efforts most effective.
11. For general educational and publicity purposes.

DISPLAY OF COMPLETED STUDY

Page 1

Accident Prone Location Study	
Combined Collision and Condition Diagram. 1	Motor Vehicle Volume (Graphic Form) 2
Analysis Summary Table 3	Other Field Studies in Form 4

Upon completion of the accident and field studies, attention must be given to how the findings, conclusions and recommendations can be prepared for the report, so as to take as little space as necessary yet be complete. On the left is pictured one method found very satisfactory. Page #1 contains miniature drawings and tables of the study. If desired, these four blocks can each be made on standard 8-1/2 x 11 sheets and then photographically reduced for the final report. Block #2 is a graphic picture of the traffic volume. Block #3 is an analysis summary table. Block #4 contains stop sign or signal obedience studies, speed, parking, street lighting,etc.

PAGE 2

HIGHLIGHT FINDINGS

a. Accident Facts
b. Intersection Conditions
c. Stop Sign or Signal Study
d. Motor Vehicle Speed
e. Parking
f. Street Lighting
g. Volume

CONCLUSIONS

(Based on Findings)

RECOMMENDATIONS

(Based on Conclusions)

On the second page are given the highlight findings, conclusions, and recommendations which explain and analyze the information given on page 1. No sketches or graphs appear on this page.

To prepare a complete study of this nature for each of the 25 "worst" corners and five "worst" streets is desirable but not necessary. Many surveys have found it satisfactory to show only a limited number in such detail. The remainder are presented in the report without sketches and in a condensed form. Further details about presenting these studies in the final report will be found on pages 102 and 103.

COMPLETING THE ACCIDENT PRONE LOCATION STUDIES

Following the completion and study of the collision and condition diagrams and the summary analysis, conclusions and recommendations can be drawn for certain of the worst accident locations.

Examples of these are shown on pages 12 and 14 of "Traffic Engineering and the Police". Most of the worst accident locations require additional study, however, and cannot be completed until additional projects are undertaken. These additional studies must be made in the field. Some of the studies that may be required are motor vehicle volume, speed check, pedestrian volume, stop sign and signal obedience, and parking. A description of how to conduct and apply each of these field studies is presented in the pages that follow. The applications accompanying each field study will clearly show how they fit in with the studies of accident prone locations, particularly when traffic control devices are involved.

MOTOR VEHICLE LAW ENFORCEMENT

It is generally recognized that the Police Department in its enforcement activities can produce a more immediate effect upon the motor vehicle accident trend than either engineering or education. The permanence of such effect is a debatable question. The point to note here is to what extent the full possibilities of law enforcement are being utilized by the local police department. This is not to be construed as suggesting an investigation of the department. On the contrary, it is a cooperative study to aid the Chief of Police in preparing a more effective enforcement program.

The principle to be followed is selective law enforcement. This means concentrating on the worst violations, worst accident locations, worst accident periods, week or year, and on the worst violators.

POLICE DEPARTMENT

PERSONNEL AND DUTIES

			NUMBER	HOW EFFICIENT	NEED INSPECTION	EXISTS ONLY ON PAPER	DOES NOT EXIST AT ALL	COMMENTS
PERSONNEL	CHIEF							
	INSPECTORS							
	CAPTAINS							
	LIEUTENANTS							
	SERGEANTS							
	DETECTIVE SERGEANTS							
	DETECTIVES							
	PATROLMEN							
EQUIPMENT	MOTORCYCLES							
	SQUAD CARS							
	RADIO CARS							
	EDUCATIONAL CARS (Voice of Safety)							
	ACCIDENT INVESTIGAT'N CARS.....	FIRST AID KITS						
		CAMERAS						
		BRAKE TESTERS						
		STEEL TAPES						
	PATROL WAGONS							
TRAFFIC CONTROL	TRAFFIC DIVISION	SUPERIOR OFFICERS						
		ACCIDENT INVESTIGAT'N SQUAD						
		FULL TIME FIXED TRAFFIC POSTS						
		PART TIME FIXED TRAFFIC POSTS						
		SCHOOL POSTS						
	TRAFFIC COURT							
	TRAFFIC ENGINEER							
TRAFFIC RECORDS	ACCIDENT REPORTS							
	PERSONAL REPORTS							
	INVESTIGATION SQUAD REPORTS							
	ACCIDENT RECORDS	SPOT MAP						
		LOCATION FILES						
		AT INTERSECTION FILE						
		BETWEEN INTERSEC'N FILE						
		DATE FILE						
		DRIVER ACC. & VIOLATION FILE						
		MONTHLY ANALYSIS						
	VIOLATION RECORDS							
	PROPER FILING EQUIPMENT							

N.C.B. No. 25

POLICE DEPARTMENT INVENTORY

An inventory of the police department personnel and equipment will provide the survey with basic enforcement data and a yardstick suitable for comparative purposes. Today most police departments are undermanned and lack sufficient motorized units. If this condition exists locally, the inventory, when compared with that of other communities, will help show why the police department must receive added support.

On the opposite page is an inventory form which may be expanded to fit the local needs. The filled-in answers and comments should give a revelatory picture.

VIOLATORS AND VIOLATIONS

N.C.B. No 26

MOTOR VEHICLE LAW VIOLATORS

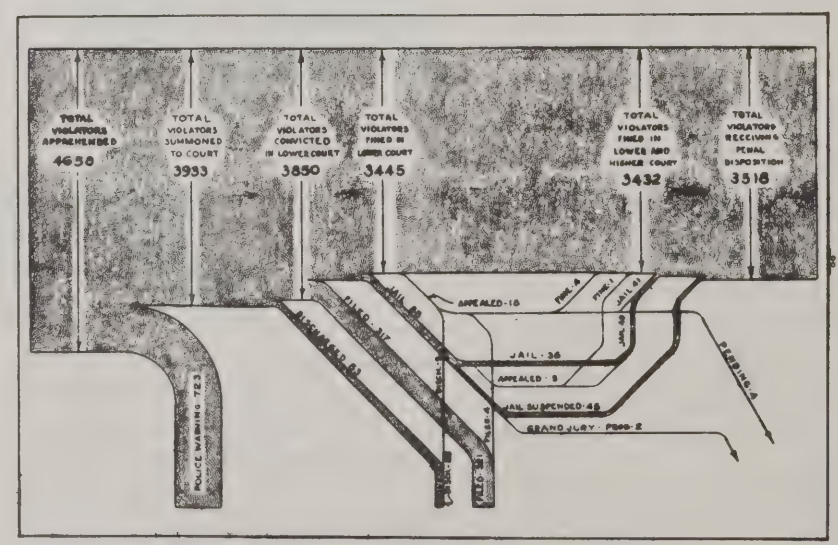
APPREHENSION - PROSECUTION - DISPOSITION

TALLY SHEET

Week or Month..... Year .....

VIOLATIONS	A	B	C	D		E	F		G	TOTAL	APPEALED			
	POLICE WARN. DISCHARGED	DISCHARGED	NOLLE	FINE PAID NO	FINE PAID AMT	FINE SUSPENDED	JAIL COMM NO	JAIL COMM DAYS	JAIL SUSPENDED		VIOLATION	DISPOSITION	VIOLATION	DISPOSITION
1											5	F&D		
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
TOTAL														

NOTE: List above the original Violation for which Motorist was stopped.



VIOLATORS APPREHENDED AND DISPOSITION OF THEIR CASES
(Read from left to right)

VIOLATORS AND VIOLATIONS

(Extent of Selective Enforcement Program - Part I)

The street and highway conservational work of the police department is measured largely, in one sense, by the number of violators apprehended, prosecuted and convicted. The type of violator referred to is not one guilty of minor infractions like the overtime parker, but one proved to have committed a moving violation.

The form on the opposite page contains space to record the principal violations which cause a majority of our accidents. Here are ten of the most common of such violations:

1. Driving too fast for conditions.
2. Driving recklessly.
3. Failing to give right of way.
4. Driving while intoxicated.
5. Failing to obey stop sign or traffic signal.
6. Failing to signal.
7. Not keeping to the right.
8. Turning improperly.
9. Having defective brakes or headlights.
10. Parking dangerously.

Opposite each should be recorded the number of traffic cases and their disposition. The column headed "Warnings" refers only to written warnings which are later filed at headquarters in the driver accident and violation file for future reference. An example is given at the extreme right of the form to show how appealed cases are recorded. One of the cases of violation #5 was appealed from the original penalty Jail (F) to Fine (D). This careful follow-up of appeal cases is necessary if a flow chart, as pictured on the opposite page, is desired.

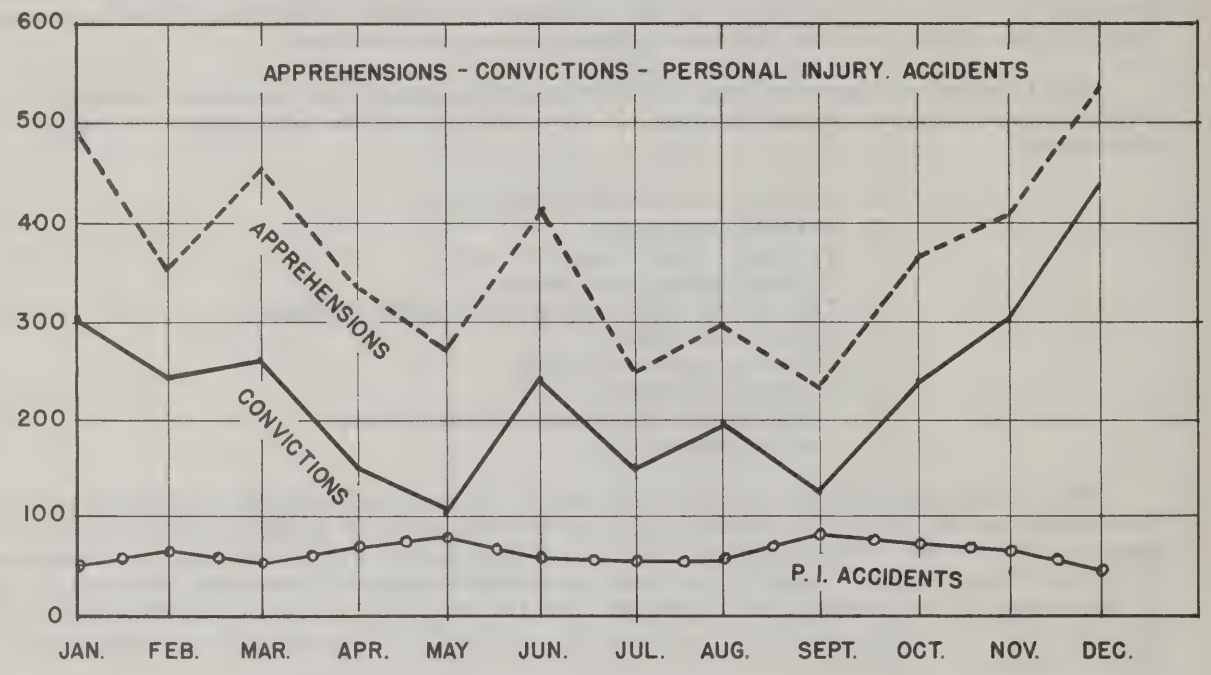
The sources of data for this study are the police records and the clerk of court records. The study should be prepared on a monthly basis so that monthly comparative charts, such as pictured on page 35, may be produced.

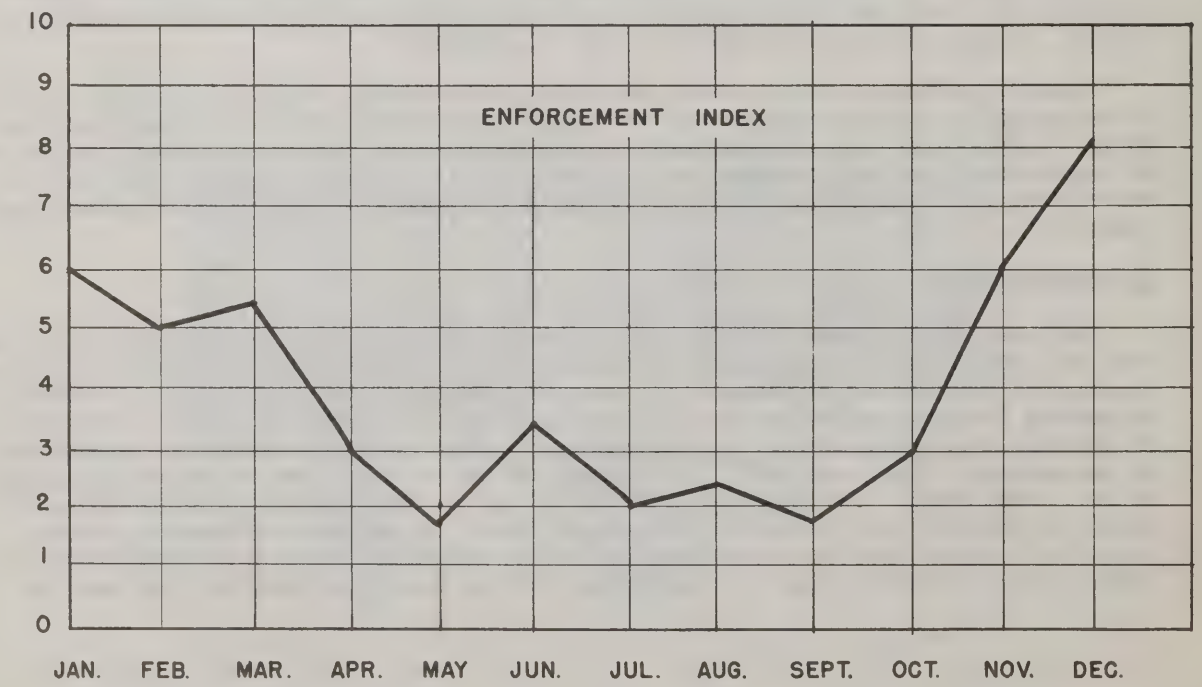
Should the Survey wish to carry this study even further, the apprehensions by time of day should be plotted against (1) the daily volume curve and (2) the daily accident curve. Also, a spot map of locations where violators were apprehended should be prepared for comparison with the accident location spot map. The latter is highly important in maintaining a selective law enforcement program and should be kept by every modern police department.

Enforcement Index.

The sum and substance of this phase of the Survey is a study of the quality and quantity of enforcement. A rough estimate of both is called the Enforcement Index. This is measured either monthly or annually by comparing the number of convictions for moving violations (parking and driver license violations are therefore excluded) to the number of personal injury accidents. The enforcement is fair if the index is two convictions to one personal injury accident. It is good if the index is five to one and excellent if it is ten to one. The index of 10 is based upon a study covering a large number of cities in which it was found that enforcement tended to decrease accidents up to the point where there were ten convictions for moving violations to each personal injury accident. Beyond that the law of diminishing returns becomes effective. See page 35.

LAW ENFORCEMENT VS. ACCIDENTS





MOTOR VEHICLE LAW ENFORCEMENT - MOTOR VEHICLE ACCIDENTS

(Personal Injury Only)

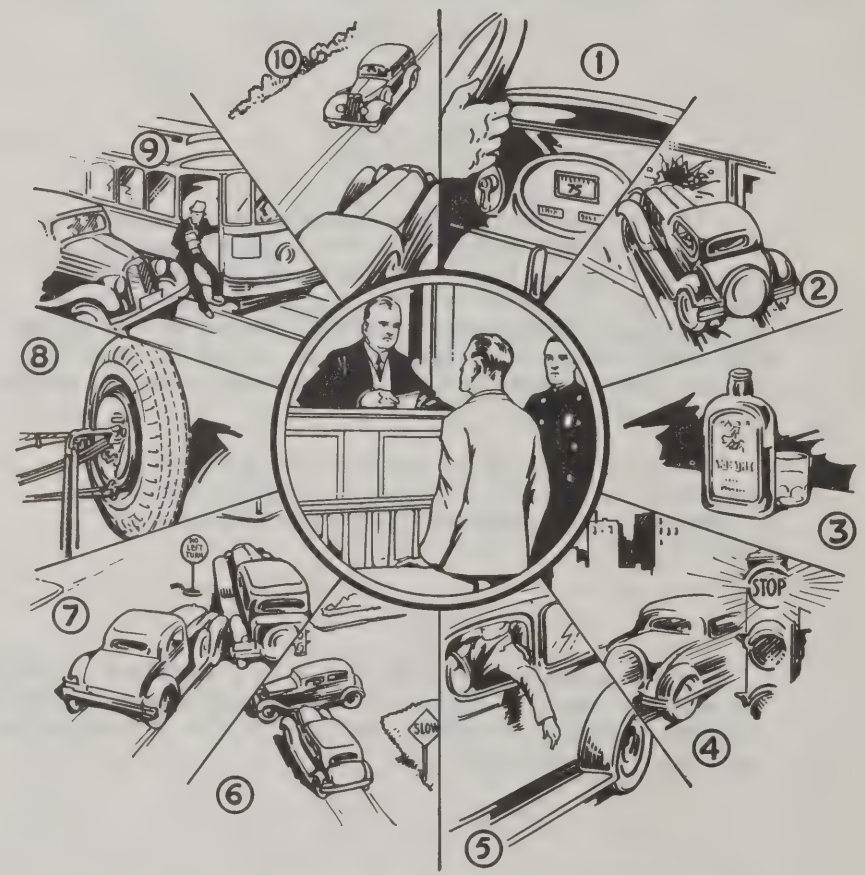
THE COURTS

On the opposite page is graphically shown how the activities of the police and courts can be quickly reviewed and compared with the personal injury accident experience. The curve marked "Apprehensions" included all written and recorded warnings issued by the Police. The "Conviction" curve includes all cases in which the violators were found guilty of committing a moving violation.

If more than 10% of the convictions involve "Suspended Sentences", a special monthly comparison of fines and jail sentences to suspended sentences should be made.

The monthly enforcement index is determined by dividing the monthly convictions for moving violations by the monthly personal injury accidents. See page 34 for further enforcement index information.

SELECTIVE ENFORCEMENT



Ten Typical Violations for a Selective Enforcement Program

APPLYING ENFORCEMENT AT THE WORST ACCIDENT LOCATIONS AND PERIODS

(Extent of Selective Enforcement Program - Part II)

A selective enforcement program is partially dependent upon applying the enforcement effort at those locations and at those times of the day, week, month and year, when accidents occur most frequently. A study should be made, therefore, to determine the extent to which such a selective enforcement program is being carried out by the police department.

Worst Accident Locations

A spot map should be made showing where the violators have been apprehended, and the beats, posts and patrols of all traffic officers, motorcycles and squad cars. This map should either be compared with the accident spot map prepared in Project #1 or the accidents should be plotted directly on the enforcement spot map. Particular attention should be focused on the enforcement effort as applied to the 25 or 50 worst accident intersections and the worst accident streets.

Worst Accident Periods

A study should be made showing the number of violators apprehended each period of the day, each day of the week and each month of the year. The number and type of traffic police assigned to each shift of the day, plus a review of when time off and vacations are given, should also be undertaken. These enforcement facts should then be checked against the accident experience to see whether enforcement effort is being applied at worst accident periods and whether the traffic police personnel is assigned in proportion to the accident experience.

ACCIDENT INVESTIGATION

BY POLICE DEPARTMENT

Number of Accidents last year .....

Number of Accidents Investigated last year .....

Type of Accidents investigated last year .....

Branch of Dept. which conducted investigation .....

No. of Officers assigned to this work .....

Amount of training Officers rec ved for this special work .....

.....

.....

AMOUNT & TYPE OF EQUIP'T.

TRANSPORTATION .....

CAMERAS .....

SUPPLIES FOR CAMERAS .....

DECELEROMETER .....

TAPES .....

REPORT FORMS

COMMENTS .....

.....

.....

.....

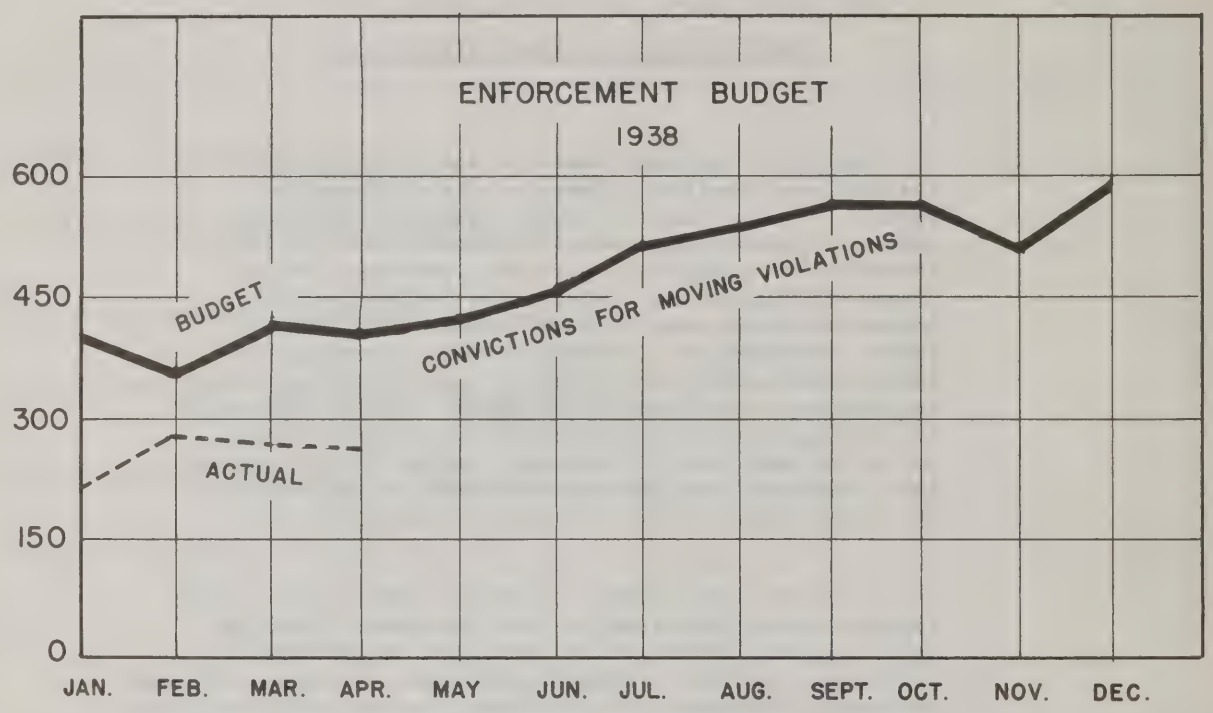
N.C.B. No. 27

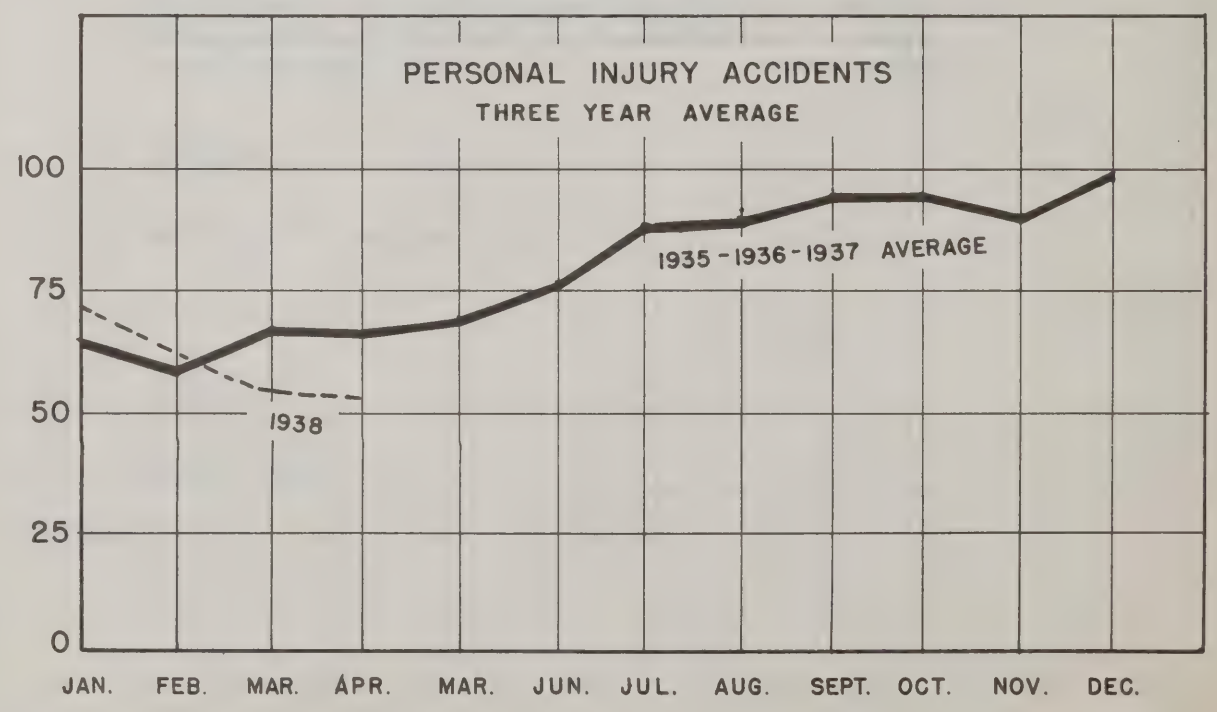
MOTOR VEHICLE ACCIDENT INVESTIGATION

Hardly an accident occurs in which a violation has not been committed by one or more of those involved. Proof of this is being brought out more and more as an increasing number of operators involved in accidents are brought to court and convicted for improper driving by those communities having specially trained accident investigation squads. In a single month the Birmingham, Alabama, Accident Investigation Squad investigated 120 accidents, arrested 92 operators and obtained convictions in 87 cases. In the same month it also apprehended and convicted ten hit-run drivers out of 12 such cases. Certainly a motor vehicle operator who causes an accident should be made to pay not only the civil claim but for the criminal negligence too.

A study of the extent to which a community's police investigate accidents may be the forerunner to setting up an accident investigation squad such as operate in Louisville, Kentucky; Evanston, Illinois; Syracuse, New York; Waterbury, Bridgeport and New Haven, Connecticut; South Bend, Indiana and Birmingham, Alabama. "Accident Prevention Bureaus in Municipal Police Departments," published by the Safety Division of the International Association of Chiefs of Police, 1827 Orrington Avenue, Evanston, Illinois, fully explains the establishment and functions of accident investigation squads.

ENFORCEMENT BUDGET





ENFORCEMENT BUDGET

The enforcement budget is not a study of what the Police Department did in the past. It involves rather the preparation of a budget of the future enforcement activities. More specifically, the enforcement budget shows about how many convictions the Police Department should obtain each month in relation to the number of accidents occurring during that month.

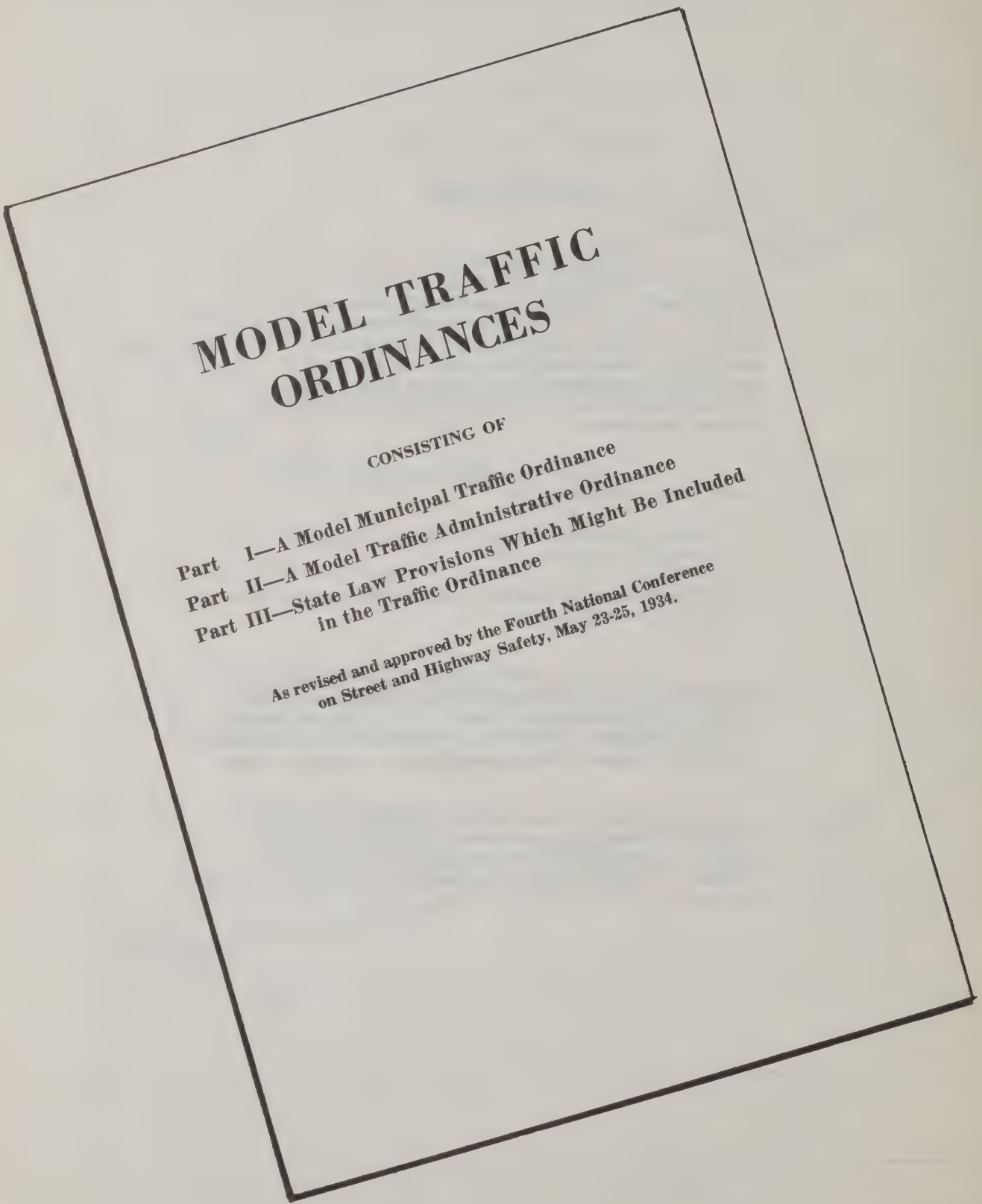
To prepare an enforcement budget requires only the following facts:

1. Monthly personal injury accidents total for the previous three years.

2. A proposed enforcement index of five to ten to be applied each month.

The actual monthly budget is determined by multiplying the three-year accident average for the month by the enforcement index. Such a budget should be shown in graph form along with the three-year monthly accident average. See sample budget on opposite page.

After the police have adopted a budget an entry should be made each month showing the actual number of convictions for moving violations and the number of personal injury accidents as compared to budget estimate.



MODEL TRAFFIC ORDINANCES

CONSISTING OF

Part I—A Model Municipal Traffic Ordinance
Part II—A Model Traffic Administrative Ordinance
Part III—State Law Provisions Which Might Be Included in the Traffic Ordinance

As revised and approved by the Fourth National Conference on Street and Highway Safety, May 23-25, 1934.

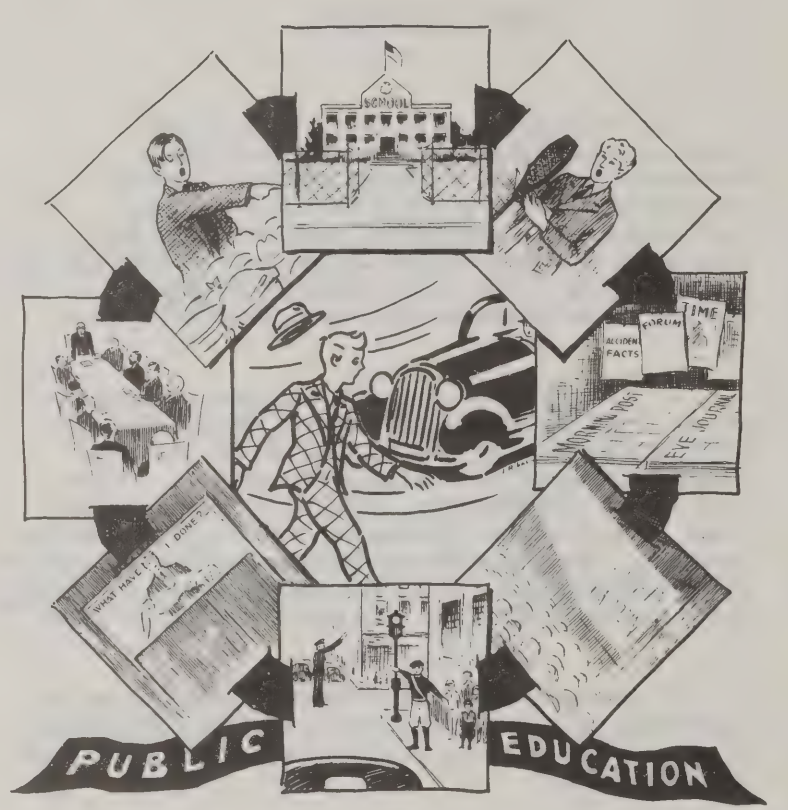
TRAFFIC REGULATIONS

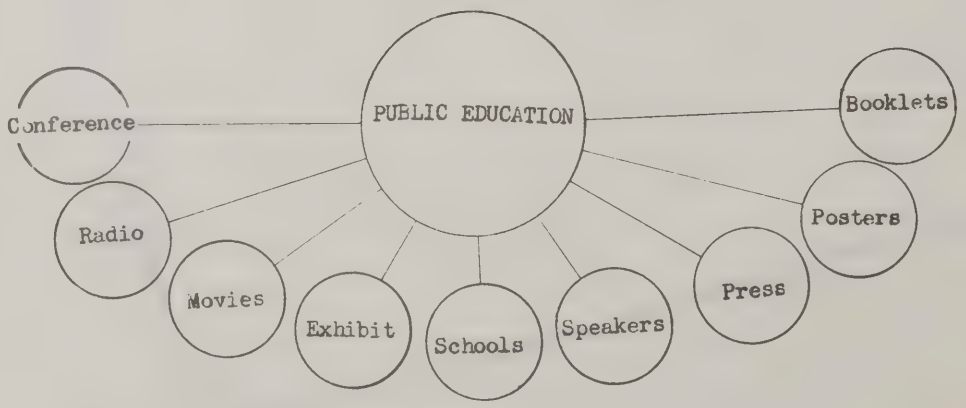
Before undertaking a review of the local traffic regulations, the survey should obtain and carefully review a copy of the Model Traffic Ordinances prepared by the National Conference on Street and Highway Safety, Washington, D. C. This model has been adopted by many cities throughout the country. It is an excellent yardstick against which to measure and check local ordinances.

If there has not been a recent recodification of the local ordinances, the Survey should make one. It is not difficult. All antiquated and irregular ordinances should be earmarked for removal. To the most recent codified copy, attach all the new regulations as well as the amendments under their respective sections. Use the model ordinances as a guide. Make sure, however, that the survey does not recommend anything that will conflict with the State traffic code.

If possible, the Survey should assist the police department or safety committee to prepare and publish a popularized edition, pocket size, of the local traffic ordinances.

SAFETY EDUCATION





SAFETY EDUCATION

Safety education is normally divided into two divisions -- child and adult. Most child education centers around the public and private schools.

Adult safety education originates from any one or combination of the following:

Newspaper	Posters
Radio	Exhibits
Theatres	Speakers and Gatherings

A study, then, of child and adult safety education in the community must center around the schools and six other media.

It is well to point out here that the Survey itself can be a wonderful educational medium if properly handled. Accident facts, engineering studies and enforcement information, if properly prepared and handled, will be used by all the agencies mentioned as the Survey progresses.

INVENTORY OF SAFETY EDUCATION ACTIVITIES IN THE SCHOOLS

Date ..... Location .....

School ..... Type - Elementary ..... Jr. High ..... Sr. High .....

Data obtained from ..... by .....

SCHOOL HOURS - from ..... to ..... from ..... to .....

AVERAGE DAILY ATTENDANCE ..... AGE OF PUPILS from ..... yrs. to ..... yrs.

AVERAGE No. OF HRS. PER CHILD PER WEEK OF INSTRUCTION IN SAFETY SUBJECTS .....

MEANS BY WHICH SAFETY EDUCATION IS CONDUCTED	
	Textbook .....
	Lectures .....
	Slides .....
	Motion Pictures .....
	Posters .....

Accidents to children during the school year since last September .....

Description: .....

.....

.....

Is there a Junior Safety Council? Yes ..... No .....

Is there an organized Schoolboy Safety Patrol? Yes ..... No .....

Number of Members in Patrol .....

Locations where Schoolboy Patrols are stationed .....

.....

SCHOOL TRAFFIC DIRECTED BY		TYPE OF TRAFFIC PASSING SCHOOL	
	Police		Autos .....
	Janitor		Buses .....
	Teacher		Trucks .....
	Children		Trolley .....

REMARKS FOR TRAFFIC IMPROVEMENT .....

.....

.....

.....

.....

N. C. B. No. 28

INVENTORY OF SAFETY EDUCATIONAL ACTIVITIES IN THE SCHOOLS

To what extent are the schools teaching safety? To what extent do pupils engage in Safety activities?

These are two important questions for the Survey to answer. Direct contact with the individual schools is the only way to ascertain the facts.

Before undertaking this inventory of school safety educational activities, the Survey Director should lay the entire plan before the Superintendent of Schools for his approval and cooperation. It is imperative that the latter furnish the Survey head with a letter of introduction to the school principals if the study is to be successful.

On the opposite page is a suggested inventory form which may be used to collect data from each school. When visiting the schools, notes should be made indicating the general interest and attitude of the principals and teachers toward safety education.

Those members of the Survey who conduct this study should be well acquainted with school programs and understand teaching methods; they should also be able to give safety talks if requested.

At the conclusion of this study, review the findings with the Superintendent of Schools, Parent-Teachers Association and Safety Committee. With their assistance, an improved safety program should be prepared for the schools.

SCHOOL CHILD PEDESTRIAN PRACTICES

SCHOOL CHILD PEDESTRIAN PRACTICES
FIELD SHEET

Date..... Location .....
Time .....M To .....M School.....

TYPES OF CONTROL IN OPERATION				
NONE	SCHOOLBOY PATROL	OFFICER	STOP & GO SIGNAL	
PEDESTRIANS	SCHOOL CHILDREN		OLDER PERSONS	
WHERE CROSSED — AT INTERSECTION — IN CROSSWALK				
WHERE CROSSED — AT INTERSECTION — NOT IN CROSSWALK				
WHERE CROSSED — BETWEEN INTERSECTIONS				
WHEN CROSSED — WITH PERMISSION				
WHEN CROSSED — AGAINST PERMISSION				
HOW CROSSED — WALKED — VIGILANTLY				
HOW CROSSED — WALKED — HEEDLESSLY				
HOW CROSSED — RAN				
DEGREE OF CAUTION USED — LOOKED ABOUT — STARTED WHEN SAFE				
DEGREE OF CAUTION USED — LOOKED ABOUT — STARTED WHEN UNSAFE				
DEGREE OF CAUTION USED — DID NOT LOOK				

N.C.B. No.29

SCHOOL CHILD PEDESTRIAN PRACTICES
SUMMARY SHEET

Date..... Location..... Weather.....

TYPES OF CONTROL IN OPERATION											
NONE			SCHOOLBOY PATROL			OFFICER		STOP & GO SIGNAL			
PEDESTRIANS			SCHOOL CHILDREN				TOTAL	OLDER PERSONS			TOTAL	GRAND TOTAL
WHERE CROSSED — AT INTERSECTION — IN CROSSWALK			NO									
			%									
WHERE CROSSED — AT INTERSECTION — NOT IN CROSSWALK			NO									
			%									
WHERE CROSSED — BETWEEN INTERSECTION			NO									
			%									
WHEN CROSSED — WITH PERMISSION			NO									
			%									
WHEN CROSSED — AGAINST PERMISSION			NO									
			%									
HOW CROSSED — WALKED — VIGILANTLY			NO									
			%									
HOW CROSSED — WALKED — HEEDLESSLY			NO									
			%									
HOW CROSSED — RAN			NO									
			%									
DEGREE OF CAUTION USED — LOOKED ABOUT — STARTED WHEN SAFE			NO									
			%									
DEGREE OF CAUTION USED — LOOKED ABOUT — STARTED WHEN UNSAFE			NO									
			%									
DEGREE OF CAUTION USED — DID NOT LOOK			NO									
			%									
TOTAL												

N.C.B. No.30

SCHOOL CHILD PEDESTRIAN PRACTICES

The Survey should be interested not only in the amount and type of safety being taught in the schools but in how well the children are applying what they learn. This can be learned only by field observations near the school buildings.

On the opposite page are given field and summary forms for conducting such a study. It should be made as the children are going to and from school, both morning and afternoons. Ideally this study should be made at all the schools, but practically this is not always feasible. It is suggested, therefore, that the study be made at the schools having the best and poorest traffic safety educational program.

The final result will be of direct benefit to the school authorities. Not only will it indicate the school practices but it will point out where special attention is needed.

OFFICE PROJECT #5 — EDUCATION

ADULT SAFETY EDUCATION

A study of the type and scope of adult safety education will, in practically all cases, reveal weak spots and unused safety educational outlets. It must be kept in mind that no one medium reaches all the motorists and pedestrians. While the newspaper is most important in any adult educational program of this nature, the radio, theatres, posters, exhibits and speakers cannot be overlooked. Each plays a considerable part in the pattern of education. Some of the organizations which can be checked for safety educational activities are the civic and luncheon clubs, Chamber of Commerce, Safety Committee, Parent-Teachers Association, churches, business organizations, American Legion, and insurance agents and companies.

The findings should be laid before the Safety Committee for careful study. Ultimately, a complete program should be outlined, tying together all those agencies conducting safety education.

Often it is desirable for the Survey itself to take an active part in the adult safety educational work. Some surveys have been able to assist in putting up posters, showing motion pictures, operating lantern slide machines, preparing radio scripts, building window displays and exhibits for expositions, preparing charts and copy for newspaper articles, and giving safety talks before gatherings. It is important, however, that all this be done with the full approval and guidance of the Safety Committee.

STREET LIGHTING vs. ACCIDENTS

STREET LIGHTING VS. ACCIDENTS #1

Year ..... Accidents ..... Street .....

From ..... To ..... Length .....

DATE	TIME A M	TIME P M	ACCIDENTS NUMBER	FATAL	INJURY	PROP'TY DAMAGE	AUTO-AUTO	AUTO-PED	AUTO-BICYCLE	AUTO-FIX'D OBJ	EXACT LOCATION INTERSECTION OR MID-BLOCK	ROAD CONDITION ASPHALT	BRICK	CONCRETE	OTHER	DRY	WET	SNOW	ICE
TOTAL																			

N.C.B. No. 31

STREET LIGHTING VS. ACCIDENTS #2

STREET LIGHTING DATA

Date..... Year..... Street.....

LOCATION	NO. OF LIGHTS	TYPE: BRACKET ARM	TYPE: COLUMN	SIZE: CANDLE POWER	SIZE: LUMEN	HEIGHT TO ℄ OF LAMP FROM PAVEMENT	SPACG: DISTANCE BET POLES ON ℄ OF STREET	ARRANG'T: ONE SIDE	ARRANG'T: STAGGERED	ARRANG'T: PARALLEL	LOCATION: INSIDE CURB	LOCATION: BEYOND CURB	LOCATION: DISTANCE FROM CURB LINE	WIDTH OF STREET	TRAFFIC: PEAK FLOW OF TRAFFIC	TRAFFIC: HOUR OF PEAK FLOW	TRAFFIC: AVERAGE TRAFFIC FLOW	REMARKS
ON BLOCK BETWEEN AND															DAYLIGHT			
															DARKNESS			
TOTAL						X												X
ON BLOCK BETWEEN AND															DAYLIGHT			
															DARKNESS			
TOTAL						X												X

N.C.B. No. 32

Automobile accidents at night have shown a general upward trend. Inadequate visibility, combined with excessive speeds, is a major factor on streets where the night accident rate is far out of proportion to the traffic volume. Adequate street lighting is one of the best means of reducing night accidents. Studies and experiments show that night accidents increase as the amount of street lighting diminishes.

Since poor visibility is a known cause of accidents, each community should make a special study to determine the relation between night traffic accidents and street lighting. With this information available, city authorities may accurately gauge the value of good street lighting, and arrive at a definite lighting policy.

Table 1, on the opposite page, indicates the information required to give a general picture of the day and night accident situation. By means of this table, definite information is secured as to month, day and hour of occurrence, as well as severity and type of accident. Pavement color has a bearing on the effectiveness of the illumination and this is further influenced by the condition of the surface.

Time will usually not permit a complete street lighting study of the entire city; hence it is suggested that four to six of the worst accident streets be chosen on which to make this special analysis. The accidents should be listed on Table 1 geographically from end to end of the street being studied. Any unusually high accident intersection should probably be given a single page.

A large share of the street lighting data on Table 2 (covering the same street area as Table 1) can be obtained from the electric light and power company or the city electrician. Although Table 2 is divided here into two blocks, it can easily be changed into any other unit of measure. If the street under observation has the same type of lighting from end to end, it is necessary to fill out only Table 2 for one typical block. The space for vehicular traffic volume should be shown separately for hours of daylight and darkness, since it is desirable to compare these two periods. The motor vehicle volume can be recorded only after completion of Field Project #2.

By comparing Table 1 with Table 2, in which the number of day and night accidents and the day and night traffic flow are known, it is possible to determine for each thoroughfare the day and night accident rate per million vehicle miles. This can then be compared with the grade of street lighting and a measure of the lighting efficiency determined. It is suggested that the method used by R. E. Simpson in his publication "Highway Lighting and Public Safety" be generally followed in this special study. (Copies are obtainable from the National Conservation Bureau).

Minimum Street Lighting Requirements

The table on the opposite page shows the minimum requirements to assure adequate street illumination. It is from the model street lighting code prepared by the Illuminating Engineering Society.

Graphic Summary

One method of showing the relation of accidents to time of day and hourly traffic volume is shown on the opposite page. Such a graph can be used for one block or street or for the entire community.

Applications

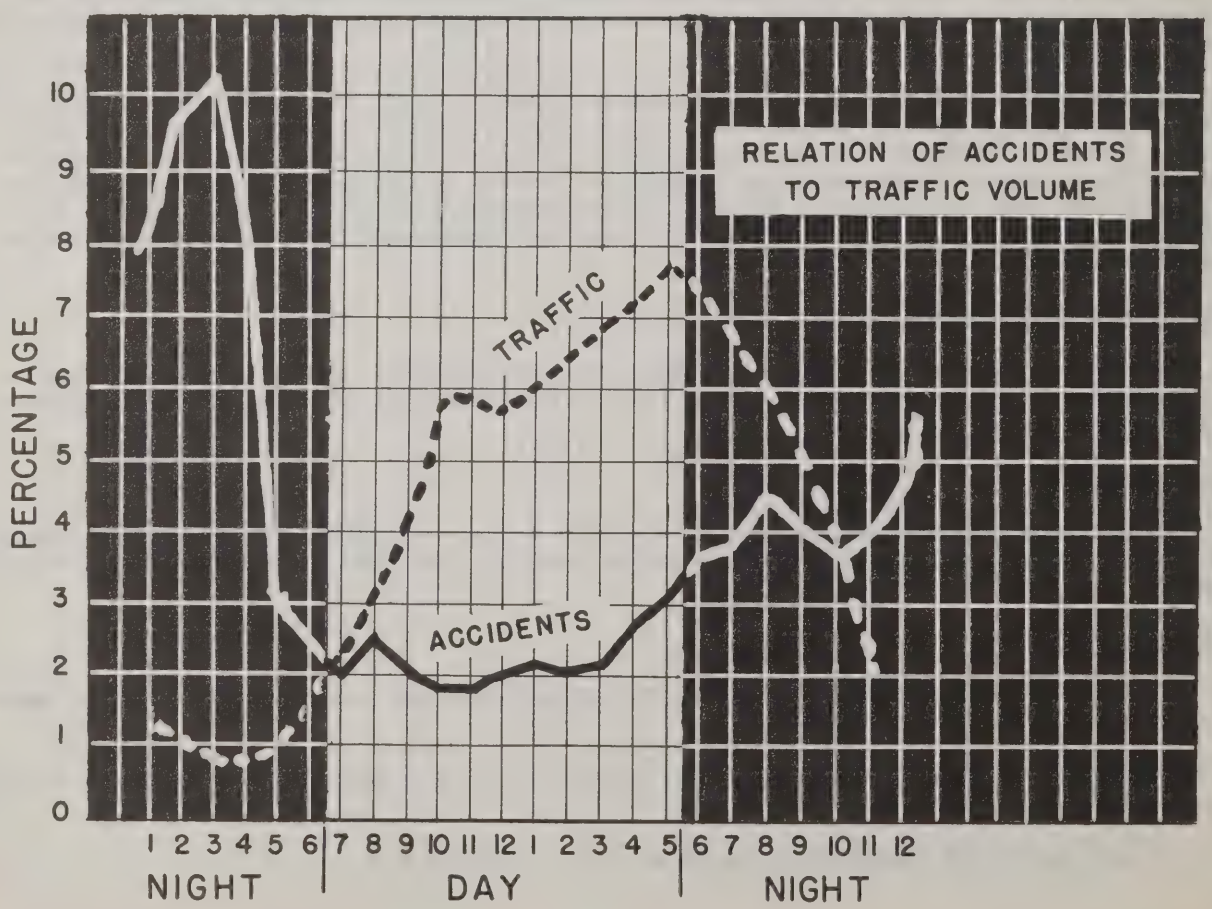
1. To show the comparative day and night accidents and the number of accidents per thousand vehicles or per million vehicle miles.

2. To show whether the street lighting is sufficient to illuminate the streets to a point of safety.

3. As a basis for recommending increased street illumination.

Minimum Street Lighting Requirements

Classification of Streets	Bulb Candle Power	Height From Ground	Spacing Maximum	Arrangement on Street
Heavy traffic thoroughfares. (More than 1500 cars per hour.)	1000	20-30′	75′ 150′	if staggered if 2 opposite
Medium traffic thoroughfares. (800-1200 cars per hour.)	1000	20-30′	150′	Staggered
Light traffic thoroughfares. (Not over 500 cars per hour.)	400	20-25′	150′	Staggered
Residence Street. (Under 200 cars per hour.)	250	18′	150′ to 200′	Staggered



FIELD PROJECTS - TRAFFIC OBSERVATIONS

The Traffic Observations in this Manual are limited to nine field projects: Physical Inventory and Hazards, Motor Vehicle Volume, Stop Sign Obedience, two Traffic Signal Obedience studies, Speed study, Parking, Pedestrian Volume, Origin and Destination, and Street Lighting. Without exception, the safe movement of traffic is given first consideration.

Each study should contribute toward giving a good cross-section of traffic conditions, amounts, characteristics and habits for the entire city. More specifically, however, the studies should include all the worst accident intersections and streets. The application of the field studies to the worst locations is given in each field project.

Conclusions and recommendations must be based upon the facts collected. If the problems are tackled with an unbiased attitude and with a farsighted and practical approach, the conclusions and recommendations will be sound.

PHYSICAL INVENTORY

Date..... Location.....

Inventory of.....

TRAFFIC SIGNALS	TYPE ..... LOCATION ..... HEIGHT ..... VISIBILITY ....
SIGNS Stop, Slow, Warning, and Directional	TYPE ..... LOCATION ..... CONDITION ..... HEIGHT ..... TEXT ..... COLOR ..... STATUS Temporary / Permanent .....
STREET MARKINGS	TYPE ..... LOCATION ..... CONDITION ..... COLOR ..... TEXT ..... VISIBILITY .....
POTENTIAL HAZARDS	TYPE ..... LOCATION ..... HEIGHT ..... EFFECT ON VISIBILITY .....

N.C.B. No.33

PHYSICAL INVENTORY OF MAJOR THOROUGHFARES

The first field project to be undertaken is a physical inventory of traffic control devices and potential physical hazards on the city streets. While confined to the major thoroughfares, the study should include all State and Federal marked streets. In all, five to fifteen streets will probably require a physical inventory.

The inventory relates largely to (1) the physical conditions of signs, signals, and markings, and (2) the existence of potential physical hazards. On the opposite page is a suggested form. One of these should be used for each intersection checked.

The three upper sections of the form should be filled out for signs (Route, Stop, No Turn, One Way, Speed, School, etc.), signals and blinkers, and for recording street markings such as painted or "mushroom" marked safety zones, traffic lanes, turning lanes, special school crossings, etc.

The lowest section is used to record every potential street hazard created by hedges, walks, billboards, embankments, etc. Following a study of the individual reports, a summary for each general classification of sign, of signal and marking by intersections and then by streets can be patterned along the lines of the field form.

From this special study is to be expected a general "dressing up" of all traffic control devices, a greater uniformity of signs and signals, the elimination of unnecessary and antiquated signs and the removal of many potential physical hazards. This information will be particularly valuable to the Police Department, the Street and Engineering Department and the Citizens' Safety Committee.

INSTRUCTION AND FIELD SHEETS

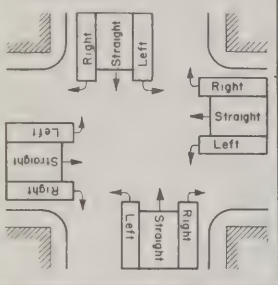
VEHICLE VOLUME COUNT

INSTRUCTIONS

Date .. Location .....

Time .. Count .....

Example of how the four squares are arranged for counting an ordinary intersection.



Draw sketch of actual intersection in blank space below. Show: (1) North Point (2) Movements counted (3) Street names and route numbers.

GENERAL INSTRUCTIONS

What to count: Unless otherwise directed the vehicles entering the intersection are the only ones counted. Each entering vehicle is tabulated, first according to the direction it is going, and then as to whether it turns right, goes straight thru, or turns left. U turns are considered as left turns. Count as vehicles all street cars, trains, motor vehicles, bicycles, motorcycles, and horsedrawn vehicles.

Tally Sheet: The tally sheet has four squares into which may be recorded the vehicles entering the intersection from each of at least four directions. When ready to count turn the tally sheet so that these squares, which really represent an entering stream of traffic moving in the direction of the arrows, will actually lie in the true directions.

Use of sheet: Use the customary tally system of making four vertical marks and a fifth one diagonally thru the four. Each page in the book is to be used for one hour. Record weather conditions at beginning and end of count and at other times when changes occur.

Equipment: (1) A watch. (2) Two or more medium hard pencils. (3) A good eraser. (4) A knife or pencil sharpener.

VEHICLE VOLUME COUNT

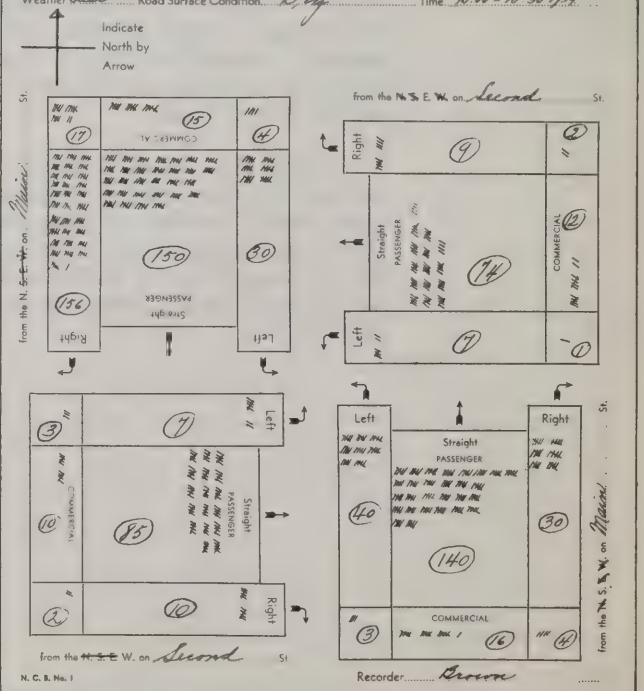
FIELD SHEET

HALF HOURLY

Date 6/20/37 Location Main & Second Streets

Weather Clear Road Surface Condition Dry Time 10:00 - 10:30 A.M.

Indicate North by Arrow



N. C. S. No. 1

Recorder Brown

VEHICLE VOLUME COUNT

Purpose: The purpose of a vehicle volume count is to obtain an accurate record of the number and direction of vehicles proceeding through an intersection or along a street during a given period. The motor vehicle volume flow chart is constructed from these individual counts. The period studied is usually 8 to 24 hours.

Where to Make Counts: Counts should be made at the following locations, in order to obtain a complete picture of the traffic flow:

1. All intersections in the business district.
2. The 25 worst accident intersections.
3. Important intersections in the residential district, particularly on the major thoroughfares running through the residential districts.
4. All signalized intersections.
5. Nearby important public buildings such as schools.
6. On major thoroughfares at city limits.

Note: When choosing intersections keep in mind the preparation of the flow chart. It is important that the counts be made so that the flow for each street may be tied together and correctly plotted.

Personnel: For most observations at intersections, only two persons are needed in making a vehicle volume count. More should be used if traffic is so heavy that two are unable to count all vehicles entering the intersection. In such cases, the general rule is to use one checker for each approach.

One checker is usually sufficient to make a vehicle volume count between intersections, but traffic may be so heavy that two are necessary.

Equipment: Pencil and eraser. Ordinary watch. Field sheet. Summary sheet. Graphic Summary sheet. Traffic counters, under certain conditions to be explained in Field Project #6.

Time and Length of Study: Vehicle volume counts should be made in good weather unless there is a specific reason for making them in bad weather. The counts should be made on days from Monday to Friday, which produce a more normal vehicle flow than Saturday or Sunday. A count is made either for 8, 12 or 24 hours. The period suitable for most purposes is that of 12 hours from 7 A.M. to 7 P.M. When to use the other periods can best be decided by the experienced analyst or the traffic engineer. Where traffic volume is consistently heavy day and night, an 18-hour count may be useful to produce records on the amount and other characteristics of evening traffic. Such a count should be made between the hours of 7 A.M. to 1 A.M.

Choice of Master Counting Station: The master counting station serves as a common denominator for all the counts made on different days. Counts are made at the master station every day that they are made elsewhere in the city. Through the master station the counts made on different days throughout the city can be adjusted to represent a typical one-day count such as would be obtained if all the counts were made on a single weekday. Details about making such adjustments are given on the next page.

(Note: If all the motor vehicle volume counts can be made in a single day the master counting station is unnecessary)

The choice of a master counting station should be an intersection at which the daily fluctuations in traffic flow can be recorded as characteristic of the general flow throughout the entire city. It should be an intersection in or near the business district, and if possible one of the 25 worst accident intersections.

With the exception of the first day that counts are made at the master station it is not necessary to record the turning movements. On the second and succeeding days that counts are made at the master station it is necessary only to obtain the total hourly flow entering the

FIELD PROJECT #2 — MOTOR VEHICLE VOLUME

VEHICLE VOLUME SUMMARY & GRAPHIC SUMMARY SHEETS
AND
TYPICAL CHARTS OF HOURLY AND DAILY MOTOR VEHICLE VOLUME

VEHICLE VOLUME COUNT

SUMMARY SHEET

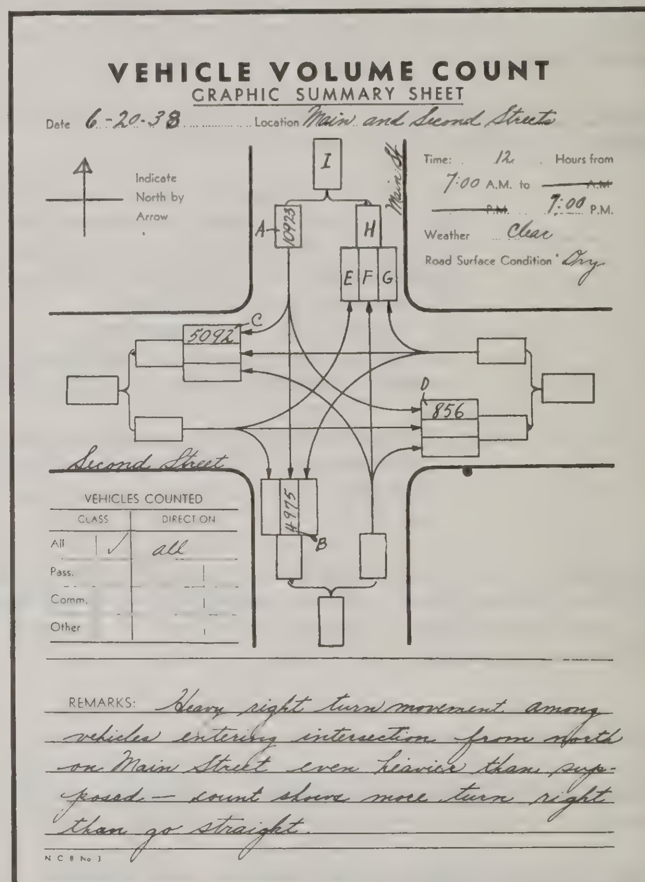
HALF HOURLY

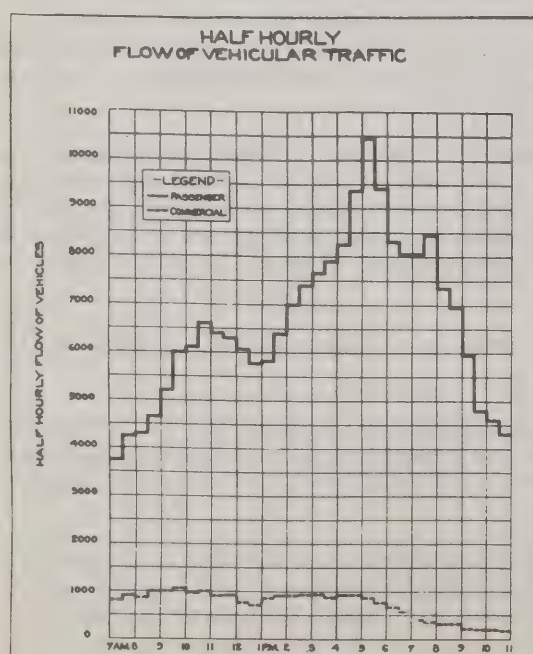
Date 6/20/38 Location Main and Second Streets
Weather Clear Road Surface Condition Dry

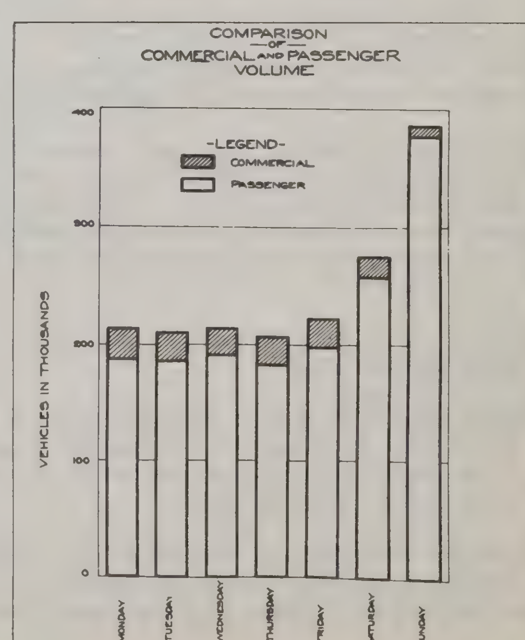
TIME STARTS 7 A.M.	from North on Main St. L	S	R	from South on Main St. L	S	R	from West on Second St. L	S	R	from East on Second St. L	S	R	HALF HOUR TOTAL
7:00—7:30	22	141	133	32	129	32	11	92	9	11	77	11	700
7:30—8:00	31	168	142	44	174	44	16	109	16	14	81	17	847
8:00—8:30	47	210	200	53	193	55	20	122	23	21	115	24	1083
8:30—9:00	51	202	222	52	185	51	18	115	20	17	112	19	1064
9:00—9:30	43	190	219	49	171	43	15	111	17	13	99	15	985
9:30—10:00	40	171	169	46	162	41	13	101	14	10	92	15	874
[illegible]	34	165	173	43	156	34	10	95	12	8	86	11	827
[illegible]	21	17[illegible]	169	32	164	23	12	99	14	4	91	16	815
[illegible]	20	150	130	45	149	31	16	104	18	12	97	14	786
[illegible]	23	168	140	41	138	29	21	120	23	19	106	25	853
[illegible]	32	201	[illegible]	37	181	35	22	147	[illegible]	20	124	29	1067
[illegible]	31	190	220	55	192	43	29	165	31	27	135	22	1140
[illegible]	28	174	184	50	184	37	23	157	26	21	121	24	1029
[illegible]	26	170	173	42	168	35	19	148	31	17	118	26	973
[illegible]	34	[illegible]	[illegible]	33	172	39	17	152	26	15	112	29	969
[illegible]	21	177	185	38	179	41	15	150	11	13	115	31	983
[illegible]	32	185	192	39	189	43	19	163	22	17	127	24	1052
[illegible]	37	199	206	41	193	39	16	168	19	14	132	27	1091
[illegible]	42	223	250	43	197	46	22	172	25	20	156	31	1227
[illegible]	44	265	291	45	234	49	27	184	30	25	163	34	1391
[illegible]	57	308	340	57	299	56	32	199	35	30	175	41	1611
[illegible]—6:00	58	367	380	68	346	61	36	204	39	34	194	31	1818
[illegible]	47	310	321	35	321	52	24	191	31	23	181	23	1584
[illegible]	41	290	288	49	286	43	22	180	26	19	169	19	1432
[illegible]													
[illegible]—8:00													
[illegible]													
[illegible]													
[illegible]													
[illegible]													
10:00—10:30													
10:30—11:00													
TOTAL	456	4975	5092	1100	4756	1002	480	3436	544	424	2978	558	26201
TOTAL OF L, S AND R	10923			6858			4460			3960			26201

Heavy right turn

N C B No. 2







intersection from each approach. Turning movements do not have to be kept separately. This will materially reduce the manpower required to maintain the master station.

Preparation of Instruction Sheet: A sample instruction sheet is shown on the opposite page. A blank space is provided in which the counter is required to draw a rough sketch of the intersection being checked. The instruction sheet also gives the length of count, explains the field sheet and its use, and describes the placement of persons making the traffic count.

Field Sheet: The field sheet is the tally sheet used in the actual counting at the location under study. Examine carefully the vehicle volume count field sheet, which is properly filled out, on the opposite page. This is the field sheet for the first half-hour of an hour count.

Note that the field sheet is marked "half hourly". A new sheet should be used every half hour.

Sometimes traffic is so heavy that a new sheet must be used every 15 minutes to provide sufficient space for all tallies.

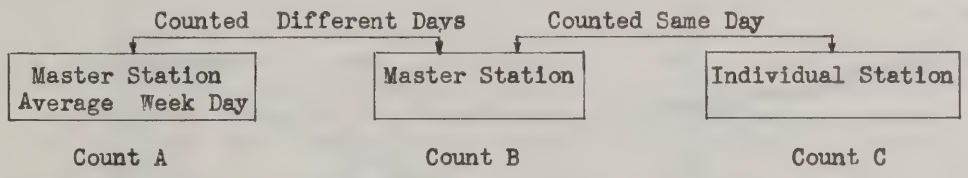
Method of Making Traffic Counts at Intersections: When two persons are conducting a vehicle volume count at an intersection, they should stand on diagonal corners. Each should count only the vehicles entering the intersection on two approaches. One man, standing on the northwest corner, should count vehicles coming from the north and from the west. The other man, standing on the southeast corner, should count vehicles coming from the south and from the east.

All vehicles entering the intersection are counted. Count as vehicles all bicycles, motorcycles, buses, trucks and passenger cars. Bicycles and motorcycles are counted as passenger cars unless they appear to be used for commercial purposes, such as making deliveries. Do not count trolley cars.

Summary Sheet: The summary sheet is a statistical compilation of the information obtained in making a vehicle volume count. The data on the field sheets are transferred to the summary sheet.

Examine carefully the model summary sheet, covering a 12-hour period, illustrated on the opposite page. Note that the figures for 10 to 10:30 A.M. are taken from the field sheet.

Adjustment of Counts: As previously mentioned, the adjustment of counts is necessary when they cannot all be made on a single day. Adjustments are made through the counts recorded at the master station, and require two steps: (1) adjustments of the day-by-day counts at the master station, (2) adjustments in the individual counts taken throughout the city on different days. Briefly, the procedure for making the adjustments is as follows:

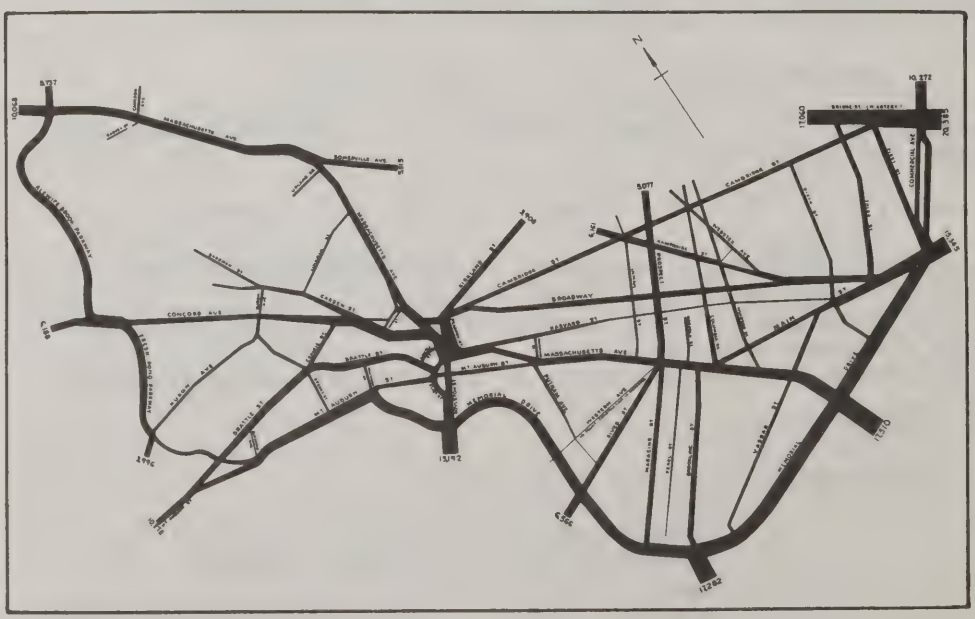


1. Choose an average weekday 12-hour count at the master station (Count A) as the common denominator of all future counts.
2. Adjust master station (Count B) to (Count A) so that the two are equal. Note the adjustment factor in so doing.
3. Apply adjustment factor determined in #2 to individual station (Count C).

Here are two typical examples of a 12-hour count:

Count A - 9000 vehicles
Count B - 8500 vehicles
Adjustment Factor - 9000/8500 - 105.9%
Count C - 4000 vehicles
Adjusted Count C - 4000 x 105.9% - 4236 vehicles

TWO TYPICAL TRAFFIC FLOW CHARTS



Count A - 9000 vehicles
Count B - 9500 vehicles
Adjustment Factor - 9000/9500 - 94.7%
Count C - 5000 vehicles
Adjusted Count C - 5000 x 94.7% - 4705 vehicles

As stated before, it is unnecessary when using the master station as a common denominator station to check all turning movements at the master station. It is necessary to obtain only the total hourly flow through the intersection. This will materially reduce the manpower necessary to maintain the master station on those days when surrounding corners are being checked.

Graphic Summary Sheet: The data for the graphic summary are obtained from the summary sheet (see page 61). The graphic summary sheet is a chart of traffic flow through an intersection. It presents a picture of how much traffic flows through the intersection, and which way it flows for an average hour, peak hour, or for the full period of the study.

A graphic summary sheet is illustrated on the opposite page. In this illustration, only the figures for vehicles entering the intersection from the north on Main Street are filled in. In actual practice the entire sheet would be filled in.

The following information must be filled out on the sheet: date and location of the study, direction of north, hourly period studied, kind of vehicle counted, and direction of traffic counted.

Preparation of Flow Chart: Once the adjustments have been completed the flow charts can be prepared. On the opposite page are two miniature 12-hour flow charts. The original of each was approximately 2 x 3 feet. The flow chart should be prepared on tracing cloth. All lettering should be sharp so the original can be reduced to fit a report and still be legible.

There are numerous applications of motor vehicle volume studies. The most important for the police include the following:

1. To justify the existence or installation of fixed-time and traffic actuated traffic signals.
2. To provide information for proper timing of traffic signals.
3. To indicate the need for stop signs and the street on which the signs should be located
4. To indicate the relation of turning movements to accidents and congestion. (See examples in "Traffic Engineering and the Police")
5. To evaluate accident data. For example: Corners A and B have the same number of accidents and Corner A carries 1000 vehicles per hour and Corner B 2000 vehicles per hour. Based on exposure, the accident rate for Corner A is greater than for Corner B, and thus Corner A should be given prior attention.
6. To reveal the relation of daytime accidents to daytime traffic volume and night time traffic volume. Such information may be used in considering street lighting, operation of traffic signals, etc.
7. As a partial basis for determining the advisability of through streets.
8. To determine the need for greater street space to be obtained through changes in parking regulations. As an aid in this determination, it should be noted that 700 vehicles per hour is generally the maximum one business street lane can carry.
9. As a partial basis for assigning police personnel to intersection duty. Generally speaking, the heavier the volume at an intersection, the greater is the justification for assigning an officer there. However, some police administrators believe that the use of police officers for intersection traffic control is undesirable in that it wastes much-needed manpower.

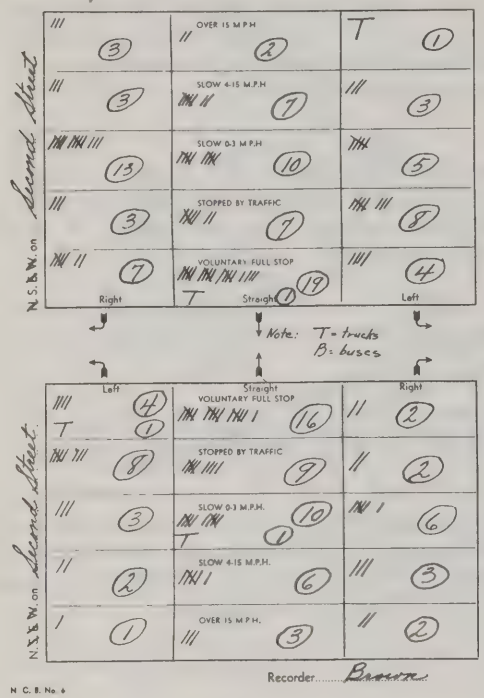
FIELD PROJECT #3 — VEHICLE OBSERVANCE OF STOP SIGNS

FIELD AND SUMMARY SHEETS

VEHICLE OBSERVANCE OF STOP SIGNS

FIELD SHEET

Date May 6, 1938 Location Broad & Second Sts.
Time 9 A. M. to 10 A. M. Weather Clear



Recorder Brown

N. C. B. No. 6

VEHICLE OBSERVANCE OF STOP SIGNS

SUMMARY SHEET

Date May 6, 1938 Weather Clear Location Broad & Second Sts.
Sign on Second Street, Facing Traffic Going south

TYPE OF VEHICLE	Made a full STOP						Almost Stopped		Entered Slow		Entered Fast		TOTAL	
	Voluntary		Stopped by Traffic		Total		0-3 M.P.H.		4-15 M.P.H.		over 15 M.P.H.			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
MORNING — TIME 9:00-10:00 A.M.														
PASSENGER	30	32	18	19	48	51	28	30	13	13	5	6	94	100
COMMERCIAL	1	50	–		1	50	–		–		1	50	2	100
TOTAL	31	32	18	19	49	51	28	29	13	14	6	6	96	100
AFTERNOON — TIME 2:00-3:00 P.M.														
PASSENGER	30	32	24	25	54	57	26	27	9	10	6	6	95	100
COMMERCIAL	3	34	1	11	4	45	1	11	2	22	2	22	9	100
TOTAL	33	32	25	24	58	56	27	26	11	10	8	8	104	100
EVENING — TIME 9:30-10:30 P.M.														
PASSENGER	7	11	11	16	18	27	22	33	16	24	11	16	67	100
COMMERCIAL	3	37	1	13	4	50	1	13	2	24	1	13	8	100
TOTAL	10	13	12	16	22	29	23	31	18	24	12	16	75	100
TOTAL														
PASSENGER	59	23	53	21	112	44	82	32	40	16	22	8	256	100
COMMERCIAL	7	37	2	10	9	47	2	10	4	21	4	22	19	100
TOTAL	66	24	52	20	121	44	84	31	44	16	26	9	275	100

N. C. B. No. 7

VEHICLE OBSERVANCE OF STOP SIGNS

1. Purpose. The purpose of a study of vehicle observance of stop signs is to obtain an accurate record of driver obedience to stop signs at a given intersection.

2. Where to Make Stop Sign Observance Study. Stop sign observance studies should be made at the following locations:

   a. All worst accident corners having stop signs.
   b. At 25 or more additional intersections scattered throughout the city.

3. Personnel. One person can usually make this study. Two persons are necessary if observance of two signs is to be checked at once and if traffic volume on the stop streets is heavy.

4. Equipment. Pencil and eraser. Ordinary watch. Field sheet. Summary sheet

5. Time and Length of Study. Stop sign observance studies should cover a period of at least one hour, and at least 50 cars should be checked at each approach. If a study is made at an accident-prone intersection, it should be made at the time when the accidents occur most frequently (as shown in the accident records).

6. Field Sheet. The field sheet is the tally sheet used in the actual counting at the location under study. Examine carefully the field sheet, properly filled out, on the opposite page.

7. Method. A stop sign observance study should not be made by a person in uniform nor should an official vehicle be parked nearby. The observer should stand where he will be inconspicuous.

   The following are instructions to the observer:

   Make a tally (check mark) for each vehicle as it enters the intersection from the stop street, recording how its driver observes the stop sign, (voluntary, full stop, stopped by traffic, etc.) and the direction the vehicle takes upon entering the intersection (right, straight or left).

   If information on observance by types of vehicles - private passenger, truck, bus, taxi, etc. - is desired, letters may be substituted for tally marks; for instance, "B" for bus, "T" for truck, "O" for taxi.

8. Summary Sheet. The summary sheet for each intersection is a statistical compilation of the information obtained in making the count. The data are obtained from the field sheets. A summary sheet is made for each sign.

   A summary sheet, properly filled out, is illustrated on the opposite page. Note that the figures for 9 to 10 A.M. are taken from the top form.

9. Drawing Conclusions. If 75 percent of all motorists make a full stop before entering the intersection, the observance rating is excellent. Experience shows that in such cases less than 1 or 2 percent of the remaining 25% will enter the intersection at speeds above 15 miles per hour. If 50 percent, the rating is good. All others are poor and indicate that non-observance is a factor in whatever control problem is under study at the location.

10. Grand Summary and Graphic Presentation. Once the summary sheets for the individual stop sign observance studies have been completed a grand summary should be prepared. The same form used for the individual summary can be used for the grand summary.

    Several samples of graphic presentation of stop sign observance, taken from the grand summary, are shown on the next page. Note that a distinction has been made between day and night observance.

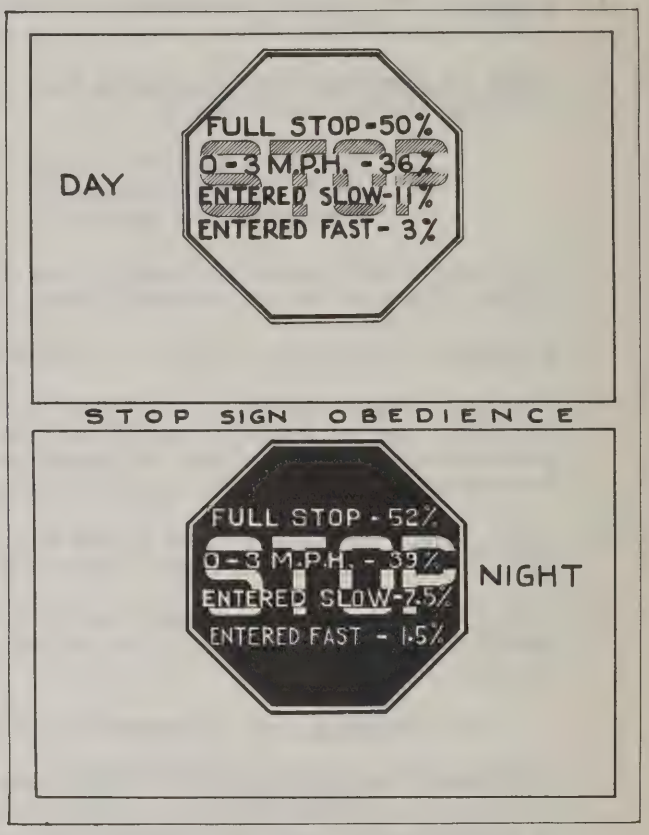
VEHICLE OBEDIENCE TO STOP SIGNS

GRAND SUMMARY SHEET

Date . Observations from to City

INTERSECTION	Made a full STOP						Practically Stopped	Entered Slow	Entered Fast	TOTAL	
	Voluntary		Stopped by Traffic		Total		0-3 M.P.H.	4-15 M.P.H.	over 15 M.P.H.		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TOTAL														

N. C. B. No. 23



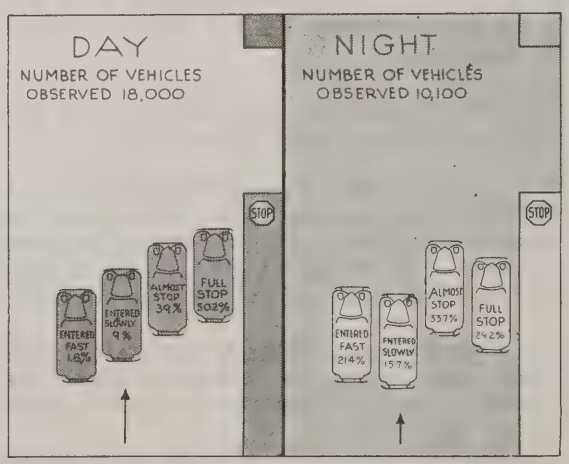


Chart Above Shows Striking Difference in Stop Sign Observance By Day and By Night. Facts Gathered in Field Study

11. Application. There are many ways in which a stop sign observance study may be applied by police officers. The more important include the following:

1. To indicate possible measures for accident reduction and generally to improve the effectiveness of stop signs as traffic control devices at the location studied.

   a. The data in the summary sheet may indicate that a special enforcement program is necessary and provide facts with which to demonstrate the need to the public.

   b. A high percentage of non-observance may mean that the stop sign is not clearly visible because it is improperly designed or improperly placed. If this sign is not a standard reflector button or other illuminated type or if it is placed too far from the curb, its usefulness at night is questionable. Data from a study will give strong evidence of the significance of this point.

   c. Seasonal or hourly variations in the quality of observance may point to obstructions to visibility such as shrubs, trees, parked cars, etc.

   d. Non-observance by motorists turning left may occur where streets are wide. Lack of visibility is a factor here also. The installation of an additional stop sign on the left side of the street, and the painting of stop lines on the pavement will help correct the situation.

   e. Non-observance by motorists turning right may occur at corners where curbs have been generously cut back. A stop line painted on the pavement and special enforcement will help to correct the situation.

2. To warrant the removal of isolated stop signs at intersections where a combination of the following three factors exists: (a) the corners are unobstructed, (b)right-angle collisions are not a problem, (c) the average full stop observance is 20% or less. Such a combination is evidence that isolated stop signs are not necessary.

3. To obtain comparative observance records (1) for the entire city; (2) for a special area; (3) for a special street (for example a throughway).

   a. Similarities or differences in observance records may produce important clues concerning remedies necessary for improving conditions.

   b. "Before and after" studies, compared with experience at other locations, will throw light on the effectiveness of techniques employed to reduce accidents or improve observance.

For further information on this subject consult the "Manual on Uniform Traffic Control Devices."

FIELD PROJECT #4 - VEHICLE OBSERVANCE OF TRAFFIC SIGNALS

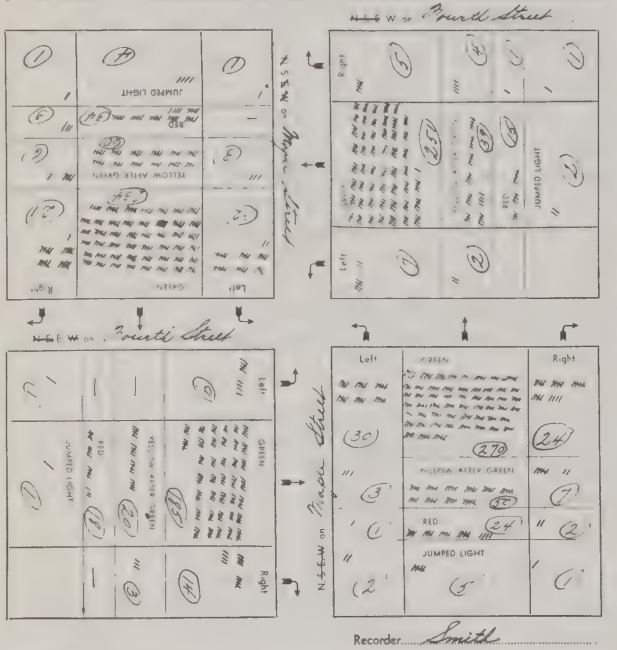
FIELD AND SUMMARY SHEETS

VEHICLE OBSERVANCE OF TRAFFIC SIGNALS

FIELD SHEET

Date 6-16-38 Location Maple & Fourth Streets

Weather Clear Time 2:00 - 3:00 PM



Recorder Smith

N. C. B. No. 11

VEHICLE OBSERVANCE OF TRAFFIC SIGNALS

SUMMARY SHEET

Date 6-16-38 Location Maple & Fourth - Maple South on Weather Clear

Morning Hour — Afternoon Hour 2 - 3 PM Evening Hour —

Entering on		PASSENGER CARS Left	Straight	Right	Sub-Total	COMMERCIAL Left	Straight	Right	Sub-Total	TOTAL Left	Straight	Right	Total
GREEN	No	32	234	21	287					32	234	21	287
	%	89	71	68	72					89	71	68	72
YELLOW AFTER GREEN	No	3	60	6	69					3	60	6	69
	%	8	18	19	17					8	18	19	17
RED	No.	0	34	3	37					0	34	3	37
	%	0	10	10	9					0	10	10	9
Jumped Light	No.	1	4	1	6					1	4	1	6
	%	3	1	3	2					3	1	3	2
Total Violators ("Jumped Light" plus "RED")	No.	1	38	4	43					1	38	4	43
	%	3	11	13	11					3	11	13	11
TOTAL	No.	36	332	31	399					36	332	31	399
	%	100	100	100	100					100	100	100	100

N. C. B. No. 10

VEHICLE OBSERVANCE OF TRAFFIC SIGNALS

Purpose. The purpose of a study of vehicle observance of traffic signals is to obtain an accurate record of driver obedience to traffic signals at a given intersection.

Where to Make Study. A study of vehicle observance of traffic signals should be made at the following locations:

1. All worst accident corners having traffic signals.
2. Signalized intersections that are experiencing considerable congestion.
3. At 20 or more additional intersections scattered throughout the city.

Personnel. Two persons are necessary to make a study of vehicle observance of traffic signals.

Equipment. Pencil and eraser. Ordinary watch. Field sheet. Summary sheet.

Time and length of Study. Traffic signal observance studies cover a period of at least one hour per observation and at least 50 vehicles should be checked at each approach to the intersection. The length of the entire study is a three-hour check: one in the morning, afternoon and evening. If a study is being made at an accident-prone intersection it should be conducted during the hours when accidents occur most frequently (as shown in the accident records).

Field Sheet. Examine carefully the field sheet, properly filled out on the opposite page.

The forms are divided into three vertical sections. Forms are divided horizontally into four sections: one for checking vehicles entering the intersection on the green, one for vehicles entering on yellow after red, one for vehicles entering on red, and one for vehicles which "jump" the red light, (that is vehicles which have been stopped by the red and start into the intersection before the red changes to green.)

Method. A traffic signal observance study should not be made by a person wearing an official uniform. The observer should stand where he can see approaching vehicles clearly, but at the same time where he will be inconspicuous.

If information on observance by types of vehicles - private passenger, bus, truck, taxi, etc. - is desired, letters may be submitted for tally marks: for instance, "B" for bus, "T" for truck, "O" for taxi, etc.

Summary Sheet. The summary sheet is a statistical compilation of observations in the field. The data are obtained from the field sheets. A separate summary sheet is made for each approach.

A summary sheet, properly filled out, is illustrated on the opposite page. Note that the figures are taken from the upper left hand form of the field sheet.

Drawing Conclusions. If 99% of all motorists enter a signalized intersection on the green signal, the observance rating is excellent. If 97%, the rating is good. Any lower rating indicates that non-observance is probably a factor in whatever problem is under study at the intersection, and remedial steps should be taken.

Grand Summary and Graphic Presentation. A grand summary can be prepared once the individual summary sheets have been completed. A sample form for this summary is shown on the opposite page.

Application. There are many ways in which traffic signal observation studies may be applied. The most important may be summarized as follows:

GRAND AND GRAPHIC SUMMARY SHEETS

VEHICLE OBSERVANCE OF TRAFFIC SIGNALS

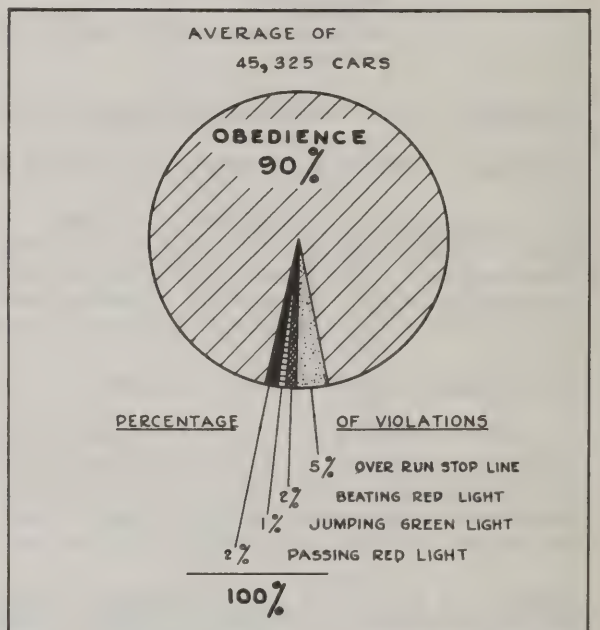
GRAND SUMMARY SHEET

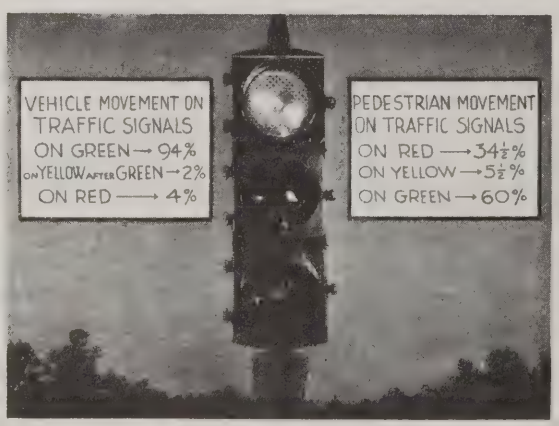
INTERSECTIONS	DATE	PASSENGER CARS					COMMERCIAL					TOTAL				
		GREEN	AMBER AFTER GREEN	RED	Jumped Light	TOTAL	GREEN	AMBER AFTER GREEN	RED	Jumped Light	TOTAL	GREEN	AMBER AFTER GREEN	RED	Jumped Light	TOTAL
TOTALS																

M. C. S. No. 24

VEHICLE OBEDIENCE TO TRAFFIC SIGNALS

GRAPHIC SUMMARY





1. To indicate possible methods for accident reduction and generally to improve the effectiveness of traffic signals as traffic control devices at the location studied.

   a. The data in the summary sheets may indicate that a special enforcement program is necessary and provide material for demonstrating the need to the public.

   b. A large percentage of non-observance may mean that the position of the traffic signal (or signals) at the intersection is improper.

   c. Seasonal or hourly variations in observance may be traced to visibility. For instance, during the summer season signals may be obscured by foliage. At night, illuminated advertising signs - especially red or green ones - may interfere seriously with the effectiveness of traffic signals, particularly if such signs are near the signals.

   d. Marked non-observance may indicate faulty signal timing. If the study shows that a large number of cars enter the intersection on yellow after green, the fact may indicate that the green period is too short to meet traffic demand. If a large number of cars enter on the red, the fact may indicate that (1) the yellow period following green is too short for prevailing speed and (2) the green period on the opposite street is too long.

   e. Where the study shows that vehicles are consistently jumping the red signal, one of two engineering errors may have been made: (1) the yellow period may be too long at the secondary street; (2) the signals may be exposed to the view of motorists waiting on either street for the green signal. A human tendency is to start moving as the green signal changes to yellow. Proper hooding of the signal lenses will help to eliminate this as a factor in non-observance.

   f. Non-observance by vehicles making left or right turns may indicate the need for (1) establishing turning lanes and stop lines, (2) providing special turning movement signals, (3) the addition of a third signal face.

   g. Non-observance at odd-shaped intersections is often the result of driver confusion due to improper location of signals. Relocation of signals and the provision of guiding lines will help clarify the situation.

2. To obtain comparative observance records (1) for the entire city; (2) for a special area; (3) for a special street.

   a. Similarities or differences in observance records may produce important clues concerning remedies necessary for improving conditions.

   b. "Before and after" studies, compared with experience at other locations, will help test the effectiveness of methods employed to improve observance.

Consult the "Manual on Uniform Traffic Control Devices" for further information on this subject.

FIELD AND SUMMARY SHEETS

PEDESTRIAN OBSERVANCE OF TRAFFIC SIGNALS

FIELD SHEET

Date 7-24-37 Location Oak and 24th Streets
Period from 3 P.M. to 4 P.M. Weather Clear
Pedestrians crossing Oak St. on the (N. S. E. W.) W side
of 24th St. in both directions

STEPPED FROM CURB ON	CROSSED STRAIGHT (crosswalk)	CROSSED DIAGONALLY	TOTAL
GREEN	120	4	124
YELLOW AFTER GREEN	57	2	59
RED	85	1	86
YELLOW AFTER RED	10	2	12
TOTAL	272	9	281

N. C. B. No. 8

Recorder Brown

PEDESTRIAN OBSERVANCE OF TRAFFIC SIGNALS

SUMMARY SHEET

Date 7-24-37 Location Oak and 24th Streets
Period from 3 P.M. to 4 P.M. — Weather Clear

STEPPED FROM CURB ON		CROSSED STRAIGHT (crosswalk)					CROSSED DIAGONALLY	TOTAL
		Pedestrians Crossing Oak Street		Pedestrians Crossing 24th Street		SUB-TOTAL		
		W Side	E Side	N Side	S Side			
GREEN	No.	120	180	148	156	604	15	619
	%	44	63	70	69	61	43	60
YELLOW AFTER GREEN	No.	57	60	31	42	190	8	198
	%	20	21	14	18	19	23	19
RED	No.	85	30	22	18	155	5	160
	%	31	10	10	7	15	14	15
YELLOW AFTER RED	No.	10	12	8	10	40	7	47
	%	5	6	6	6	5	20	6
TOTAL		272	282	209	226	989	35	1024

N. C. B. No. 9

PEDESTRIAN OBSERVANCE OF TRAFFIC SIGNALS

Purpose. The purpose of this study is to obtain an accurate record of pedestrian obedience to traffic signals at a given intersection.

Where to Make Study. The study of pedestrian observance of traffic signals should be made at the following locations:

1. All signalized worst accident corners where numerous pedestrian accidents have occurred.

2. All signalized intersections where pedestrian volume is heavy.

Personnel. At a four-way intersection, four persons are needed to make this study.

Equipment. Pencil and eraser. Ordinary watch. Field sheet. Summary sheet.

Time and Length of Study. Pedestrian signal observance studies should cover a period of at least one hour. If a study is made at an accident-prone intersection, it should be made at the time when the accidents occur most frequently (as shown in the accident records).

Field Sheet. The field sheet is the tally sheet used in the actual counting at the location under study. A separate field sheet is used for each crossing at the intersection. Examine carefully the field sheet, properly filled out, on the opposite page.

The field sheet is divided so that pedestrians may be noted (1) as to when they step from the curb: on the green signal, on the yellow following the green, on the red, or on the yellow following the red (should the signal be non-standard), and (2) as to whether they cross straight (on the cross-walk) or cross diagonally (fail to use the cross-walks).

Method. The method of making a pedestrian signal observance study is so similar to the method, already explained, for making a vehicle signal observance study that a detailed description is not necessary. Each person engaged in the study notes the pedestrians using one crosswalk or stepping from either curb of that crosswalk and crossing the intersection diagonally. Each should stand where he has a clear view of pedestrians using the crosswalk he is checking.

Summary Sheet for Individual Studies. The summary sheet is a statistical compilation of observations in the field. The data are obtained from the field sheets. Note that in the case of a pedestrian signal observance study there is only one summary sheet, unless the intersection has more than four approaches.

A summary sheet, properly filled out, is illustrated on the opposite page. It is one summary sheet for the same study as shown in field sheets.

Conclusions. If 90 percent of all pedestrians step from the curb on the green light, the observance rating is excellent. If 75 percent, the rating is good. Below 75 percent it is poor and indicates that non-observance may be a factor in whatever problem is under study.

Grand Summary and Graphic Presentation. A grand summary can be prepared once the individual summary sheets have been completed. A sample form for the grand summary is shown on the opposite page.

Several samples of graphic presentations of the pedestrian observance of traffic signals taken from the grand summary, are shown on the next page.

Application. There are many ways in which a pedestrian traffic signal observance study may be applied by the police:

GRAND SUMMARY SHEET AND GRAPHIC FORMS

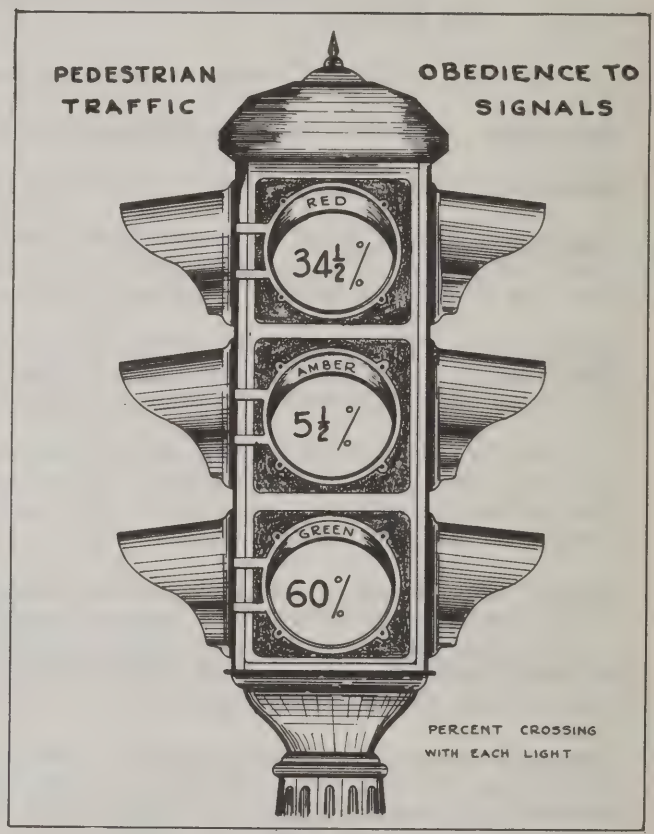
PEDESTRIAN OBSERVANCE OF TRAFFIC SIGNALS

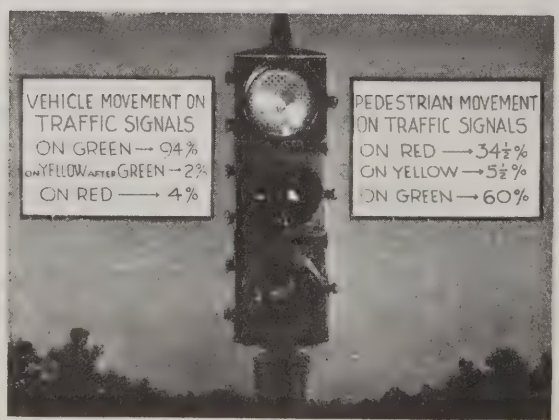
GRAND SUMMARY SHEET

Month. ..... Year..... All Pedestrians Observed.....

		INTERSECTIONS													TOTAL
STEPPED FROM CURB ON															
GREEN	No.														
	%														
AMBER AFTER GREEN	No														
	%														
RED	No.														
	%														
AMBER AFTER RED	No														
	%														
TOTAL															

N.C.B. No. 36





1. To indicate possible methods for accident reduction and generally to improve the effectiveness of traffic signals as pedestrian control devices at the location studied.

   a. The data in the summary sheet may indicate that a special educational program is necessary.

   b. A high percentage of non-observance may mean that the signal is not clearly visible to pedestrians because it is (1) improperly located, or (2) because no signal face exists for pedestrians crossing in the directions where non-observance exists.

   c. A large disobedience by pedestrians crossing a major street may indicate (1) the green signal period is too short to accommodate the pedestrian volume or the red period is so long that pedestrians will not wait; (2) a vehicle turning movement retards and endangers pedestrian movement. The latter can be corrected by establishing a special pedestrian signal period or by prohibiting the turns which are causing the trouble, if such a prohibition does not seriously interfere with the flow of traffic.

   d. If pedestrians crossing the street diagonally, whether with or against the signal, are a factor hampering control at an intersection, the condition may be due to (1) lack of designated crosswalks. (2) "light jumping" motorists forcing pedestrians out of the crosswalks, (3) improper location or operation of signals, as noted in (b) and (c) above, or (4) need for a physical barrier.

2. To obtain comparative observance records (1) for the entire city, (2) for a special area, (3) for a special street.

   a. Similarities or differences in observance records may produce important clues concerning remedies necessary for improving conditions.

   b. "Before and after" studies help test the effectiveness of remedies designed to improve observance conditions. Consult the "Manual on Uniform Traffic Control Devices" for further information on this subject.

SPEED CHECK

FIELD SHEET

Date 4-10-38 Location Grand & 8th Direction South on Grand

Time 3:30 PM Weather Clear Road Surface Condition Dry

SECONDS	M.P.H. for 88 ft.	M.P.H. for 176 ft.	PASSENGER CARS	No. Cars	LIGHT COMMERCIAL	No. Cars	HEAVY COMMERCIAL	No. Cars	TOTAL
1	60.0	120.0							
1-1/5	50.0	100.0							
1-2/5	42.8	85.7							
1-3/5	37.5	75.5							
1-4/5	33.3	66.6							
2	30.0	60.0	1	1					1
2-1/5	27.2	54.5	11	2					2
2-2/5	25.0	50.0	1111	4					4
2-3/5	23.0	46.1	1111 11	7					7
2-4/5	21.4	42.8	1111	5					5
3	20.0	40.0	1111 1111 11	12					12
3-1/5	18.7	37.5	1111 1111 1111 11	17	1	1			18
3-2/5	17.6	35.2	1111 1111 1111 1111 1	21			1	1	22
3-3/5	16.6	33.3	1111 1111 111	13	11	2			15
3-4/5	15.7	31.5	1111 1111 1111	15	1111	4	11	2	21
4	15.0	30.0	1111 1111 1111 1	16	11	2	1	1	19
4-1/5	14.2	28.9	1111 1111 1	11			11	2	13
4-2/5	13.6	27.2	1111 1111 11	12	1	1	1	1	14
4-3/5	13.0	26.1	1111 1111	10			111	3	13
4-4/5	12.5	25.0	1111 1	6	11	2	11	2	10
5	12.0	24.0	1111 11	7			1	1	8
5-1/5	11.5	23.0	1111 1	6					6
5-2/5	11.1	22.2	1111	4	1	1	1	1	6
5-3/5	10.7	21.4	1111	5					5
5-4/5	10.3	20.6	11	2					2
6	10.0	20.0	111	3	11	2	1	1	6
6-1/5	9.6	19.3	1	1	1	1			2
6-2/5	9.3	18.7					1	1	1
6-3/5	9.0	18.1	1	1	11	2			3
6-4/5	8.7	17.6					11	2	2
7	8.5	17.1	11	2	1	1			3
7-1/5	8.3	16.6					1	1	1
7-2/5	8.1	16.2	1	1					1
7-3/5	7.8	15.7					1	1	1
7-4/5	7.6	15.3			1	1			1
8	7.5	15.0							
8-1/2	7.0	14.1							
9	6.6	13.3			11	2			2
9-1/2	6.3	12.6							
10	6.0	12.0							
11	5.4	10.9			1	1			1
12	5.0	10.0							
13	4.6	9.2							
14	4.2	8.5							
15	4.0	8.0							
16	3.7	7.5							
17	3.5	7.0							
18	3.3	6.6							
19	3.2	6.3							
20	3.0	6.0							
N. C. B. No. 12			TOTAL	184		23		20	227

SPEED CHECK

Purpose. The purpose of a motor vehicle speed check is to obtain an accurate record of speeds at which vehicles are approaching a given intersection or proceeding along a given street.

Where to Make Study. A study of vehicle speeds should be made at the following locations:

1. All worst accident intersections not controlled by traffic signals not stop signs.

2. Ten to 25 mid-block locations where the accident experience has been higher than normal.

3. Sections of five worst accident streets. (Numbers 2 and 3 obviously tie together). When planning this section of the survey try to locate speed checks in each section of the city to assure a cross-section of city-wide speeds as well as at specific "worst" accident areas.

Personnel. Two persons are needed in making a motor vehicle speed check.

Equipment. Pencil and eraser. Stop watch. Fifty or 100 foot tape. Field sheet. Summary sheet.

Time and Length of Study. Speed studies should be made at those times when the records show that accidents occur most frequently at the location. This usually results in the study being divided into three parts and a check of one hour or not less than 50 vehicles made each period.

1 hour between 9 - 12 A.M.
1 hour between 3 - 6 P.M.
1 hour between 8 - 10 P.M.

This check should be made in good weather. Bad weather observations are made only when the police wish to obtain information showing vehicle speeds under unfavorable road and weather conditions.

Field Sheet. The field sheet is the tally sheet used during the actual making of the speed check. Examine carefully the speed check field sheet, properly filled out, on the opposite page.

At the top are spaces for noting the date and locations of the study, the direction of the vehicles checked, the time the study is made, and the weather and road surface conditions.

The field sheet is divided into vertical sections so that passenger cars, light commercial cars (usually less than 1 ton), and heavy commercial cars may be noted separately. The sheet is divided horizontally to provide spaces for noting vehicle speeds according to how many seconds the vehicles take to cover either 88 or 176 feet, as will be explained below.

One field sheet should be used for each direction of movement. Two field sheets per period are therefore needed.

Method. In making a speed check at an approach to an intersection, one checker stands at the point where the street enters the intersection. He holds a stop watch reading in one-fifth seconds. The other checker stations himself at a point exactly 88 or 176 feet back from the first checker. While the choice of either distance is not important, 88 feet is more suitable for checks at intersection approaches on business and residential streets.

As a car passes the checker who is farther from the intersection, he signals with his hand and the other checker starts his stop watch. As the car passes the latter he stops the stop watch. He then reads the time it took the car to cover the distance,

SPEED CHECK

SUMMARY SHEET

Date 4-10-38 Location Grand & 8th Direction South on Grand

Time 3:30 P.M. to 4:30 P.M. Weather Clear Road Surface Condition Dry

M. P. H.	PASSENGER CARS			LIGHT COMMERCIAL			HEAVY COMMERCIAL			TOTAL		
SPEED RANGE	NO. OF VEHICLES	AVERAGE SPEED		NO. OF VEHICLES	AVERAGE SPEED		NO. OF VEHICLES	AVERAGE SPEED		NO. OF VEHICLES	AVERAGE SPEED	
	No.	Factor	Product	No.	Factor	Product	No.	Factor	Product	No.	Factor	Product
80—Plus												
75—79.9		77.5			77.5			77.5			77.5	
70—74.9		72.5			72.5			72.5			72.5	
65—69.9		67.5			67.5			67.5			67.5	
60—64.9	1	62.5	62.5		62.5			62.5		1	62.5	62.5
55—59.9	—	57.5			57.5			57.5			57.5	—
50—54.9	6	52.5	315.		52.5			52.5		6	52.5	315.
45—49.9	7	47.5	332.5		47.5			47.5		7	47.5	332.5
40—44.9	17	42.5	722.5		42.5			42.5		17	42.5	722.5
35—39.9	38	37.5	1425.	1	37.5	37.5	1	37.5	37.5	40	37.5	1500.
30—34.9	44	32.5	1430.	8	32.5	260.	3	32.5	97.5	55	32.5	1787.5
25—29.9	39	27.5	1072.5	3	27.5	82.5	8	27.5	220.	50	27.5	1375.
20—24.9	27	22.5	607.5	3	22.5	67.5	3	22.5	67.5	33	22.5	742.5
15—19.9	5	17.5	87.5	5	17.5	87.5	5	17.5	87.5	15	17.5	262.5
10—14.9	—	12.5		3	12.5	37.5		12.5		3	12.5	37.5
5— 9.9	—	7.5			7.5			7.5		—	7.5	
0— 4.9	—	2.5			2.5			2.5		—	2.5	
TOTAL	184	X	6055	23	X	572.5	20	X	510.	227	X	7137.5
AVERAGE MILES PER HOUR	X	X	32	X	X	25	X	X	25	X	X	31

N. C. B. No. 13

and makes a tally on the field sheet in the space provided opposite the corresponding figures in the column headed "Seconds". For instance, if it took a private passenger car 2-4/5 seconds to cover the distance, he would make a tally in the passenger car column in the space opposite the figure "2-4/5" in the column headed "Seconds".

The columns headed "M.P.H. for 88 ft." and "M.P.H. for 176 ft." show the vehicle speeds. For instance, suppose the distance used in the check is 88 feet and a vehicle takes 2-4/5 seconds to cover it. Look on page 77 in the space opposite "2-4/5" in the column headed "M.P.H. for 88 ft." and you find the figure 21.4. This means that the car was going at the rate of 21.4 miles per hour.

Speed checks at places other than approaches to an intersection are made in the same way. The only difference is that checkers should station themselves at points toward the middle of the block. The 176-foot measure is usually used for mid-block and rural speed checks.

Individual Summary Sheets. The individual summary sheet is a statistical compilation of the information obtained in making a speed check. The data on the field sheet are transferred to the summary sheet. It is used to obtain information on average speeds.

Average speeds are used in all speed determination except critical and stated speeds.

Examine carefully the model summary sheet, properly filled out, on the opposite page.

At the top of the summary sheet are spaces for noting the date and location of the study, the direction of the vehicles checked, the time the study was made, and the weather and road conditions. Passenger cars, light commercial cars and heavy commercial cars are listed separately on the summary sheet. There are spaces for noting the number of vehicles proceeding within five-mile ranges of speed, starting at 0 - 4.9 miles per hour, and going as high as 80 plus miles per hour.

The number of cars checked proceeding within each of these speed ranges is noted in the column headed "No. of Vehicles".

Immediately to the right of this column is a column headed "Average Speed Factor," in which are printed the average speeds for the various speed ranges. For instance, the factor for the 55-50.9 range is 57.5. Multiply the number of vehicles by the factor and write the result in the column headed "Average Speed-Product." After this has been done for all the speed ranges, add all the figures in the first column (No. of Vehicles), all the figures in the third column (Average speed - Product). Divide the latter total by the former, and the result will be the average speed of all the vehicles noted. For instance, in the sample summary sheet it will be seen that a total of 184 passenger cars were checked and that these had a total product of 6055. 6055 divided by 184 gives an average speed of 32 miles per hour for passenger vehicles.

The speeds of the light commercial and heavy commercial cars are recorded in the same way. The average speed of all types of vehicles is computed by obtaining the total of all cars checked, the total of all products, and dividing the latter by the former. In the sample sheet, for example, 7137.5 (total product) divided by 227 (total vehicles) gives 31 (average speed of all vehicles).

Grand Summary and Graphic Presentation. On the opposite page is illustrated a form for summarizing all the speed checks made on one street or all streets. On this page is also a sample graphic presentation of the speed check which can be applied to one intersection or street or to the entire city.

Conclusions. Many safety experts agree that 85% of the motorists do what is safe. Applying this to the speed check means that we can assume that 85% of the motorists travel at or below a safe speed. This figure should prove helpful in determining the safe speed and new speed limits for any street. For further facts see applications below and pages 85-87, inclusive, of "Traffic Engineering and the Police".

Application. The speed checks recorded on pages 77 and 79 were made at a signalized intersection during the green periods. The yellow period on the signal is timed for two seconds. The period is too short for an average speed of 31 miles per hour. On the

SPEED CHECK

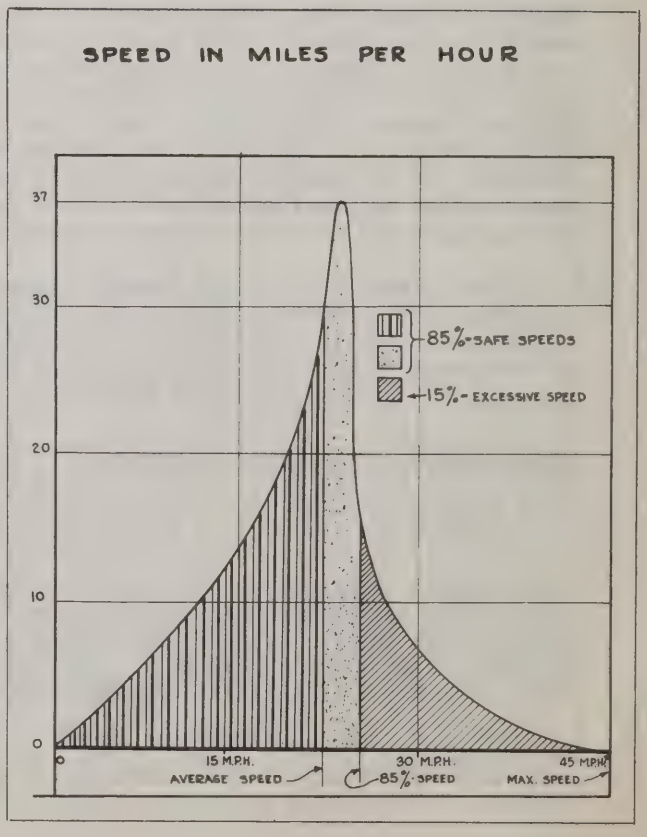
MOTOR VEHICLE SPEEDS

SUMMARY SHEET

INTERSECTION OR STRAIGHTAWAY	TYPE OF VEHICLE						TOTALS		
	PASSENGER			COMMERCIAL					
	AVER	85%	MAX.	AVER	85%	MAX.	AVER.	85%	MAX.
TOTAL									

N.C.B. No 34

SAMPLE
GRAPHIC FORM



basis of this study, an increase of the yellow period from two seconds to three seconds is warranted.

There are several applications of motor vehicle speed studies, the most important for police use including:

1. To aid in revealing whether or not prevailing speeds are too fast for conditions.
2. To aid in determining the length of yellow periods. In practice it has been found that the following lengths of yellow periods have proved satisfactory for three ranges of average speed:

Average Speed	Length of Yellow
Under 35 mph	3 seconds
36 to 50 mph	4 to 5 seconds
51 mph and over	5 to 6 seconds

   At offset intersections, extremely wide or complicated intersections, and on grades, it may prove necessary to add one or two seconds to the above periods.
3. To provide information for determining the actual distance required to stop on given streets or at given intersections. The stopping distances for various speeds on dry pavement (computed by figuring a driver reaction time of three-quarter second plus a braking deceleration* of 17 feet per second squared), are as follows:

Speed in M.P.H.	15	20	25	30	35	40	45	50	60
Total Stopping Distance (Ft.) Dry Pavement	31	27	67	90	117	145	178	214	294

4. To indicate the relationship of night accidents to night speeds. Are accidents more frequent at night, and are average speeds faster? If so, it is likely that increased speed is a factor in the night accident situation.
5. To determine a reasonable speed limit for a given street. It is recommended that stated speed zones be established not to exceed that speed at or below which 85 percent of the vehicles are operated.
6. To aid in determining type of sign (stop or slow) on the basis of critical speeds.
7. To determine proper location of directional and warning signs based on stopping distances of vehicles at speeds observed. Here are the distances from the intersection at which such signs should be located for five ranges of average speed:

Under 15 miles per hour	36 feet
16 to 25 " " "	55 "
26 to 35 " " "	101 "
36 to 50 " " "	180 "
51 miles per hour and over	300 "

8. To aid in planning an enforcement program directed toward the upper speed bracket. The plans for a speed enforcement program should be based primarily on the accident experience. See Sections on selective enforcement, pages 20 and 37, in "Accident Prevention Bureaus in Municipal Police Departments."

9. To aid in determining the need for street illumination. Where in a comparatively well-illuminated zone speeds are high and they carry over onto a section of the highway which is not well illuminated, a speed study may show the need for improved illumination of the latter zone.

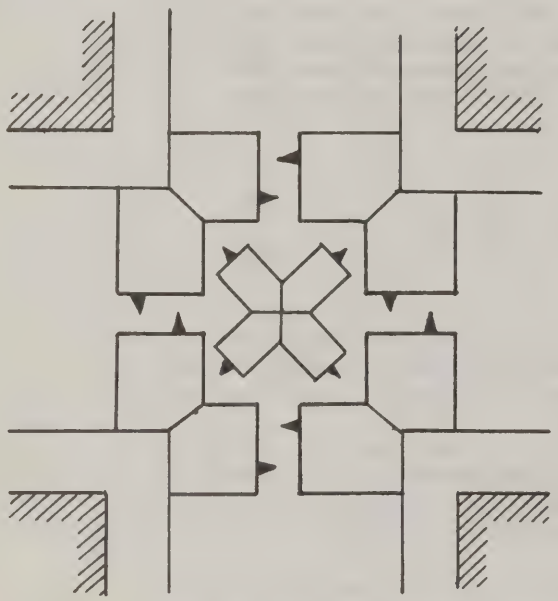
*Braking deceleration will vary for different types and conditions of road surface.

PEDESTRIAN VOLUME COUNT

INSTRUCTIONS

Date..... Location.....

Example of how the four squares are arranged for counting an ordinary intersection.



Draw sketch of actual intersection in blank space below. Show: (1) North Point (2) Movements counted (3) Street name and route numbers.

General Instructions.

What to count Unless otherwise directed all pedestrians at the intersection are counted.

Tally Sheet The tally sheet has five squares into which may be recorded the direction of the pedestrian at the intersection.

Use of the Sheet Use the customary tally system of making four vertical marks and the fifth one diagonally through the four. Each page in the book is to be used for one hour. If clickers are used, record in the proper space the initial reading at the beginning of the hour subtract to find the actual count. Record the weather conditions at the beginning and end of the count and at other times when changes occur.

PEDESTRIAN VOLUME STUDY

Purpose. The purpose of a pedestrian volume study at an intersection is to obtain an accurate record of pedestrians crossing the streets, distinguishing between those crossing at the cross walks and those crossing diagonally.

When to Make Count. The pedestrian volume study for a traffic safety survey is made at the following minimum locations:

1. All intersections experiencing more than two pedestrian accidents in 12 months.
2. Those signalized intersections where pedestrian volume may constitute a problem.
3. Mid-block locations experiencing pedestrian accidents.
4. Other intersections or mid-blocks requested by official and private agencies.

Personnel. Two or more persons are generally needed in making a pedestrian volume count at a four-way intersection. If the volume is so heavy that one person is able to count pedestrian traffic at only one crosswalk, four persons will be necessary. Five-minute experimentation at an intersection will show officers in charge the number of men needed.

Equipment. Pencil and eraser. Ordinary watch. Field sheet. Summary sheet.

Time and Length of Study. Pedestrian volume counts should be made in good weather. The count should cover a period of at least six consecutive hours, normally from 12 noon to 6 P.M.

Preparation of Instruction Sheet. A sample instruction sheet is shown on the opposite page. One of these sheets and ten field sheets form the field pad for each checker. The ten field sheets provide for six counts of one hour each and four spare sheets to be used if the volume is unusually heavy.

Field Sheet. The field sheet is the tally sheet used in the actual counting at the intersection under study. Examine carefully the pedestrian count field sheet, properly filled out, on the opposite page. At the top of the field sheet are places for filling in the day and location of the study, the time, the weather, and the direction of north. To avoid errors, hold sheet so that arrow and top of sheet always point north.

A new field sheet should be used for each hour the study is made.

On the field sheet are four identical forms, each one representing a corner of the intersection. Each of these forms is divided into two sections (marked A and B in the upper left hand form in sample field sheet). As indicated by the arrows, pedestrians crossing from one of the curbs forming the corner are to be tallied in one section and pedestrians crossing from the second curb forming the corner are to be tallied in the other. In addition to the four forms mentioned, there is in the corner of the field sheet a fifth form, shaped like an "X" and divided into four sections. This is used to record the pedestrians who cross the intersection diagonally as well as those who fail to use the crosswalks defining the intersection.

Method. When only two persons are conducting a pedestrian count, they should stand on diagonally opposite corners. Each should (1) count all pedestrians, except jaywalkers, crossing the intersection from his corner and to his corner(see arrows on forms on page 85), (2) count jaywalkers on one of the two diagonals.

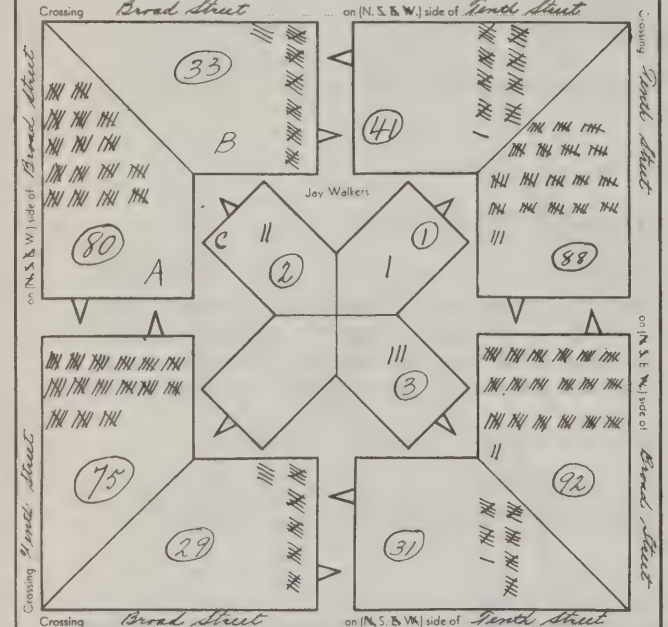
Make a tally (check mark) in the proper space for each pedestrian as he enters the intersection. For instance, a tally in the section marked A of the upper left hand form in Fig. 4 records a pedestrian proceeding south who crossed Tenth Street on the west side of Broad Street. A tally in the section marked C of the center form indicates a pedestrian who crossed diagonally from the southeast corner to the northwest corner of the intersection.

PEDESTRIAN FIELD AND SUMMARY SHEETS

PEDESTRIAN COUNT
FIELD SHEET

Date 7/20/38 Location Broad & Tenth Sts. Indicate North by Arrow
Time 11:00 A. M. to 12:00 M. Weather Clear

Crossing Broad Street on (N. S. & W.) side of Tenth Street



REMARKS

Recorder Smith

N. C. S. No. 4

PEDESTRIAN COUNT
SUMMARY SHEET

Date 7-20-38 Location Broad & Tenth Streets
Weather Clear

TIME	Crossing on West side of Broad St. — GOING S	GOING N	TOTAL	Crossing on East side of Broad St. — GOING S	GOING N	TOTAL	Crossing on North side of Tenth St. — GOING E	GOING W	TOTAL	Crossing on South side of Tenth St. — GOING E	GOING W	TOTAL	Jay Walkers	TOTAL
11A-12	80	75	155	88	92	180	53	41	94	29	31	60	6	475
12-1P	120	138	258	131	143	274	37	42	79	35	41	76	3	690
1P-2P	105	116	221	115	126	241	41	39	80	31	39	70	5	617
2P-3P	94	102	196	101	109	210	45	47	92	28	33	61	9	568
3P-4P	111	115	226	122	137	259	55	61	116	34	39	73	7	681
4P-5P	130	166	296	141	159	300	62	73	135	41	46	87	6	824
TOTAL	640	712	1352	698	766	1464	273	303	576	198	229	427	36	3855
HOUR AVE	106	118	193	116	127	244	45	50	96	33	38	71	6	642
TOTAL HOUR AVE	904						331						6	642

N. C. S. No. 5

Fig. 5 is not an exact illustration of a field sheet for a pedestrian count made by two or more persons. In actual practice there would be a field sheet for each person participating in the count. In the case of two persons making the count, two of the four corner forms and two sections of the "jaywalkers" form would be filled out on one field sheet. The others would be filled out on a second sheet.

After the count is completed, (1) add up the tallies in each space, (2) write each total in numerals in that space, and (3) circle it.

Summary Sheet. The summary sheet is a statistical compilation of the information obtained in making a pedestrian volume count. The data are obtained from the field sheets.

A summary sheet, properly filled out for a six-hour count, is illustrated on the opposite page. Note that the figures for 11 A.M. to 12 noon are taken from the field sheet.

At the top are places to fill in the day, location, and weather.

Spaces are provided on the summary sheet for recording the number of pedestrians crossing on each side of the streets forming the intersection, according to whether they were going north or south, or east or west. For instance, the figure 80, immediately after the space marked "11A-12" in the extreme left column means that during the hour from 11 A.M. to 12 noon, 80 pedestrians on the west side of Broad Street crossed Tenth Street going south.

There are also spaces on the summary sheet provided for the following:

a. total number of jaywalkers each hour
b. total number of pedestrians each hour
c. totals for the entire count
d. hourly averages for the entire count
e. total hourly average for each street

For example, examination of the summary sheet on the opposite page will show

a. a total of six pedestrians jaywalked beteen 11 A.M. and noon
b. a total of 475 pedestrians crossed the intersection between 11 A.M. and noon
c. during the entire count a total of 640 pedestrians on the west side of Broad Street crossed Tenth Street going south
d. an hourly average of 106 pedestrians on the west side of Broad Street crossed Tenth Street going south
e. a total hourly average of 904 pedestrians on Broad Street crossed Tenth Street.

Graphic Summary Sheet. Once a summarization of the pedestrian volume for a given intersection has been made the totals should be placed on a graphic form similar to that shown on the opposite page.

Application of Counts. Assume that this study was made because a number of pedestrian accidents had occurred at this intersection. The count shows that pedestrian volume crossing the major street averages more than 300 per hour for six consecutive hours. This average, if combined with an average of 750 cars entering the intersection on the major street during the same six hours, would warrant a fixed-time traffic signal.

Various ways in which pedestrian volume studies may be applied by the police are summarized as follows:

1. To warrant fixed-time traffic signals,
2. To indicate the need for special pedestrian protection when installing or timing signals.

    a. Where the pedestrian volume crossing the main street exceeds the vehicular volume of the secondary street, it is necessary to base signal timing partially on the pedestrian volume.

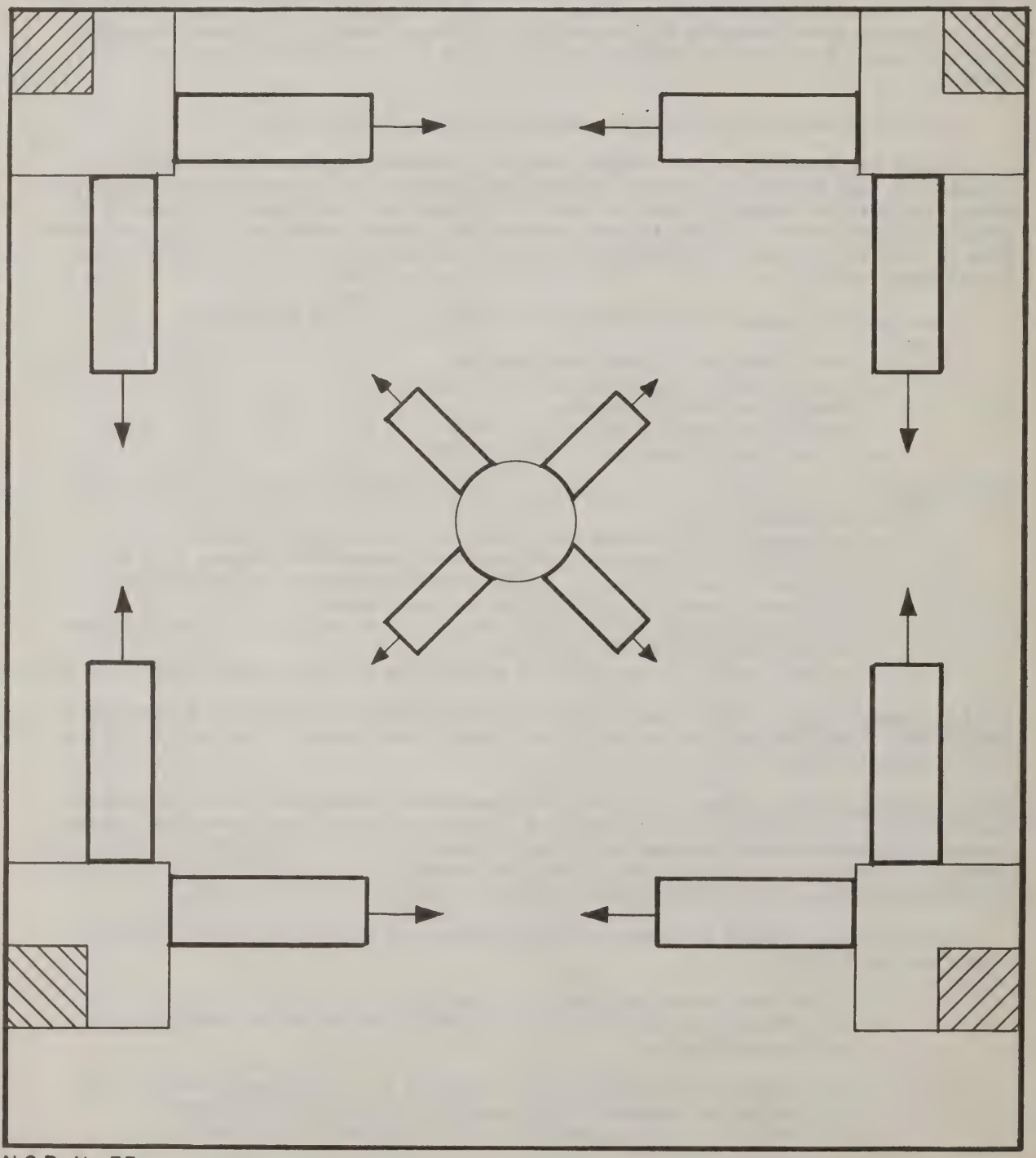
    b. Intersections in the vicinity of a large public building, theatre,

PEDESTRIAN COUNT

GRAPHIC SUMMARY SHEET

Date..... Location .....

Time: From..... M. To..... M.



N.C.B. No. 35

school or church commonly have wide variations in pedestrian volume. Actuated signals controlled by pedestrian push buttons will improve pedestrian safety at such locations.

3. To determine the extent of jaywalking at an intersection. If more than 5 percent of the pedestrians jaywalk when crossing the intersection (that is, cross diagonally or outside the accepted crosswalk) that should be considered abnormal and steps taken to remedy the situation.

4. To decide whether pedestrian volume in certain directions and at certain times of day requires regulations to eliminate interference with pedestrian movement by turning vehicles during those periods.

STREET PARKING - FIELD AND SUMMARY SHEETS

STREET PARKING

FIELD SHEET

Location North side of Broad Street
from Third Street to 175' east of Third Street
Date 4-21-38 Weather Clear Time — a.m. 3 p.m. — Night

VEHICLE IDENTIFICATION [Registration numbers]	TYPE OF VEHICLE [See code]	TYPE OF PARKING: PARKED NO OCCUPANT	TYPE OF PARKING: LIVE PARKING	TYPE OF PARKING: LOADING & UNLOADING	TYPE OF PARKING: SELLING & ADVERTISING	POSITION OF VEHICLE: PROPERLY PARKED	IMPROPER PARKING: WRONG SIDE	IMPROPER PARKING: DOUBLE PARKING	IMPROPER PARKING: TOO FAR FROM CURB	IMPROPER PARKING: TOO CLOSE TO CORNER	IMPROPER PARKING: SAFETY ZONE	REMARKS
446	P	✓								✓		
263	P	✓				✓						
941	P	✓						✓				
137	T			✓							✓	
922	P		✓			✓						
612	P	✓						✓				
889	P	✓				✓						
93	C		✓			✓						
334	C		✓						✓			
411	P	✓				✓						
106	P	✓						✓				
134	P	✓				✓						
601	P	✓				✓						
141	T			✓				✓				
422	P	✓				✓						
398	P	✓						✓				
SUMMARY P		12	11	1	—	—	7	—	4	—	1	—
SUMMARY C		2	—	2	—	—	1	—	—	1	—	—
SUMMARY T		2	—	—	2	—	—	—	1	—	—	1
TOTAL		16	11	3	2	—	8	—	5	1	1	1

N. C. S. No. 14

Code:—P - Passenger Auto, C - Taxi Cab, T - Truck

Recorder Browne

HAZARDOUS PARKING

SUMMARY SHEET TYPE 1A

Location North Side of Broad Street
from Third Street to 175' east of Third Street
Date 4-21-38 Weather Clear

TYPE OF VEHICLE	TIME OF CHECK	TYPE OF PARKING: PARKED NO OCCUPANT	TYPE OF PARKING: LIVE PARKING	TYPE OF PARKING: LOADING & UNLOADING	TYPE OF PARKING: SELLING & ADVERTISING	POSITION OF VEHICLE: PROPERLY PARKED	IMPROPER PARKING: WRONG SIDE	IMPROPER PARKING: DOUBLE PARKING	IMPROPER PARKING: TOO FAR FROM CURB	IMPROPER PARKING: TOO CLOSE TO CORNER	IMPROPER PARKING: SAFETY ZONE	
PASSENGER	10 A.M.	13	2	—	—	8	-	5	1	1	—	
	3 P.M.	11	1	—	—	7	—	4	—	1	—	
	8 P.M. NIGHT	16	1	—	—	12	—	2	1	1	—	
	SUB-TOTAL	40	4	—	—	27	—	11	2	3	—	
TRUCKS	10 A.M.	—	1	1	—	1	—	1	—	—	—	
	3 P.M.	—	—	2	—	—	—	1	—	—	1	
	8 P.M. NIGHT	1	—	—	—	1	—	—	—	—	—	
	SUB-TOTAL	1	1	3	—	2	—	2	—	—	1	
TAXI CABS	10 A.M.	—	3	—	—	1	—	1	1	—	—	
	3 P.M.	—	2	—	—	1	—	—	1	—	—	
	8 P.M. NIGHT	—	2	—	—	2	—	—	—	—	—	
	SUB-TOTAL	—	7	—	—	4	—	1	2	—	—	
SUMMARY	10 A.M.	13	6	1	—	10	—	7	2	1	—	
	3 P.M.	11	3	2	—	8	—	5	1	1	1	
	8 P.M. NIGHT	17	3	—	—	15	—	2	1	1	—	
	TOTAL	41	12	3	—	33	—	14	4	3	1	

N. C. S. No. 15

STREET AND OFF-STREET PARKING STUDY

Purpose The purpose of this parking study is to obtain an accurate record of

1. the use to which curb space is put,
2. the kinds of improper parking prevalent on a given street,
3. location and amount of off-street parking spaces.

Where to Make Study. The parking study is usually confined to the following:

1. Central business area
2. Important neighborhood business areas.

Each designated block should be given a number which can later be placed on the field sheet.

Personnel. One person is needed for each block in making a street parking study. One person or more may be used to make the entire off-street parking study.

Equipment. Pencil and eraser. Ordinary watch. Field Sheet for Street Parking. Field Sheet for Off-Street Parking. Summary sheets for each.

Time and Length of Study. The street parking study should be made from 8 A.M. to 10 P.M. on weekdays. It does not have to be completed in one day nor is a master check necessary. If there is insufficient personnel for a 14-hour study of each block, the study may be confined to a six-hour period, 9 - 11 A.M., 2 - 4 P.M. and 6 - 8 P.M. The off-street parking study can be made at any time.

Preparation of Digest of Parking Laws and Map of Business District. Since one of the purposes of the street parking study is to show all types of parking violations, each observer should be given a digest of the local parking ordinances to aid him in distinguishing the parking violations. This digest should, for example, explain how close vehicles may be parked to corners, crosswalks, and traffic control devices.

Each observer should also be given a map of the business section showing those streets or blocks which he is to study. The blocks should be numbered.

Field Sheet for Street Parking Study. The field sheet is the tally sheet on which observations made during the study are to be recorded. A model field sheet, filled out for a 175-foot section of one street, is shown on the opposite page. When a study is to be made on the four sides of a business block, the field form can be divided into four sections horizontally and made to apply for the entire area.

At the top of the field sheet are spaces for noting location, date, time, and weather. If the location covers four sides of a business block, it will simplify the description to designate the block location by a number.

The field sheet is divided vertically into columns which provide spaces for checking certain facts about each car observed. The first column is headed "Vehicle Identification (Registration Numbers)". The last three numbers of the license plate on each vehicle observed are written in this column.

The next column is headed "Type of Vehicle". In this column the type of vehicle (passenger, commercial, etc.) is recorded, using the code: "P" for private passenger cars, "T" for trucks, "O" for taxicabs, etc.

HAZARDOUS STREET PARKING

HAZARDOUS PARKING

SUMMARY SHEET - TYPE IB

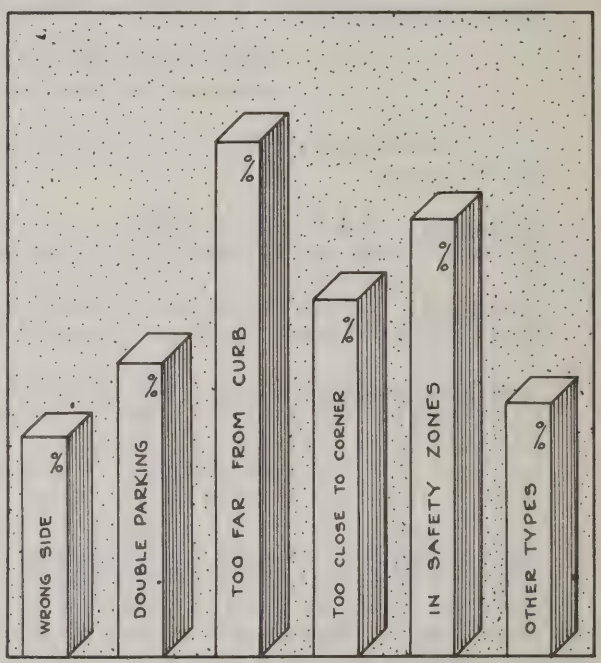
LOCATION (At and Between Intersection)	WRONG SIDE	DOUBLE PARKING	TOO FAR FROM CURB	TOO CLOSE TO CORNER	SAFETY ZONE	OTHER TYPES	TOTAL
TOTAL							

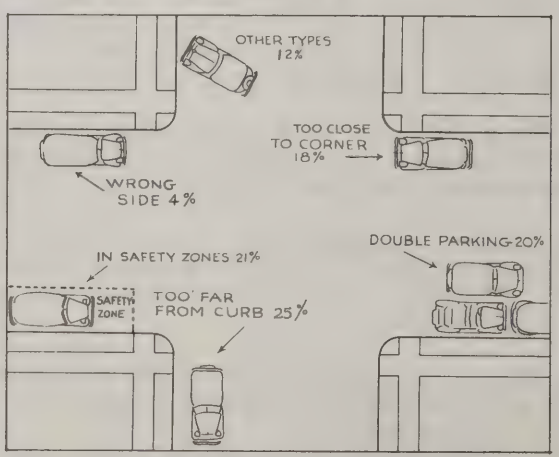
N.C.B. No.37

HAZARDOUS PARKING

GRAPHIC SUMMARY SHEET

Date_____At_____Locations.





Picture Chart Above Shows Various Kinds of Hazardous Parking. Facts Can Be Gathered in a Field Study.

Next come four columns under the general heading "Type of Parking." The first is for noting cars parked without occupants. The second is for noting "live parking", that is, a car parked with its motor running and a person at the wheel. The third is for noting vehicles parked for the purpose of loading and unloading. The fourth is for noting vehicles used for selling and advertising, such as cars from which salesmen are selling foodstuffs or articles, or cars carrying some advertising display. Push carts should be counted in this group.

The next columns come under the general heading of "Position of Vehicle". The first column is for noting cars properly parked. Then come columns for noting various kinds of improper parking: (1) parked on the wrong side of the street, (2) double parked, (3) parked too far from curb, (4) parked too close to the corner, (5) parked in a safety zone, such as a crosswalk, bus stop, or too close to a hydrant. One column is left blank for indicating other unspecified forms of improper parking which may be observed.

Finally, there is a column for special remarks. At the bottom of the field sheet are spaces for noting the total number of passenger cars, trucks, taxicabs, and other types of vehicles checked, and spaces for the grand totals.

A new field sheet is used every twenty minutes, which is about the time required to circle a complete block. To make a complete study of one block on all four sides usually requires two field sheets per complete round, three rounds per hour, or a total of six field sheets per block per hour.

Method. In making a street parking study, start at one end of the street or block under study. Fill in the last three numbers of the plate of each vehicle and make a check mark in each column applicable to that vehicle. For instance, examination of the field sheet will show that the first vehicle observed bore the last three numbers 441, was a private passenger car ("P"), was parked without occupants, and was parked too close to the corner.

Note - Occasionally it may be desirable to note the full registration number so the owners of vehicles may be identified. This should be done if the police wish to determine the extent to which store employees are using curb space to pakr their cars near their place of work.

The study is repeated every twenty minutes. For instance, if the study is made on a street where the parking limit is 60 minutes and the vehicle having the last three numbers 441 is noted in the same location at twenty-minute intervals on four successive field sheets, the sheets reveal that the vehicle was parked at least twenty minutes overtime.

Individual Summary Sheets. There are two types of individual summary sheets. The first, pictured on the opposite page, shows the type of parking and position of vehicle by classes of vehicles and time of day. Examination of this summary shows that during the three periods of the day studied, 41 cars were parked without occupants on the north side of Broad Street from Third Street to a point 175' east of Third Street. Twelve cars were "live parked," three cars were parked for purposes of loading and unloading, no cars were parked for use in selling or advertising. It is shown further that 33 cars were properly parked, and that of those improperly parked, none was parked on the wrong side of the street, 14 were parked double, 4 were parked too far from the curb, 3 were parked too close to the corner, and 1 was parked in a safety zone.

The second type of individual summary sheet, shown on the following page, gives the number and length of time the three classes of vehicles parked at the curb.

Both of these summary sheets can be used for a section of a street, an entire street or four sides of a block.

STREET PARKING DURATION

STREET PARKING
SUMMARY SHEET – TYPE 2A

Location ..... Block No. ....

Date ..... Time ..... Weather .....

		MINUTES					2 Hrs. or MORE	4 Hrs. or MORE
		20	40	60	80	100		
MORNING	PASS'R							
	COMM'L							
	TOTAL							
AFTERNOON	PASS'R							
	COMM'L							
	TOTAL							
BOTH	PASS'R							
	COMM'L							
	GRAND TOTAL							

N.C.B. No. 38

STREET PARKING
SUMMARY SHEET – TYPE 2B

PARKING TIME	PASSENGER			COMMERCIAL			GRAND TOTAL
	A.M.	P.M.	SUB-TOTAL	A.M.	P.M.	SUB TOTAL	
Less than 20"							
40" to 60"							
40" to 60"							
1 hr. to 2 hrs.							
2 hrs. to 3 hrs.							
3 hrs. to 4 hrs.							
4 " to 5 "							
5 " to 6 "							
6 " to 7 "							
7 " to 8 "							
8 " to 9 "							
9 " to 10 "							
10 " to 11 "							
11 " to 12 "							
12 " to 13 "							
13 " to 14 "							

N.C.B. No 39

Composite Summary Sheets and Graphic Summary Sheets. A summary of hazardous parking for the entire business area can be shown on the form opposite. Two sample graphic forms for this summary are also shown on the opposite page.

The composite summary sheet showing parking periods is the same as that for the individual street or block summary: hence a special form is not necessary for this summarization.

Off-Street Parking Study. No special forms are needed for this study. The field observations and findings can be recorded directly onto a large map of the business section. When conducting this study it is important to record not only all present parking areas but also potential parking areas. See the map on the following page. From this map can also be prepared a summary showing the capacity and daily use of each off-street parking facility.

Application. The fact that 14 cars were parked double on this street during three periods studied in one day indicates that double parking is a major problem on this street. This may be a problem for better enforcement of the rule prohibiting double parking. Or it may be that enforcement should be directed against overtime parkers, who are preventing the general use of available curb space. Again, it may be that the permissible parking limit is too long. For instance, if ninety-minute parking is allowed, perhaps the limit should be reduced to one hour. All these possibilities must be investigated so that the proper solution of the double parking problem may be found.

Data from street parking studies may be used as follows:

1. To reveal dangerous parking practices at or near accident-prone intersections and on accident-prone streets, which may be corrected by engineering or by enforcement.

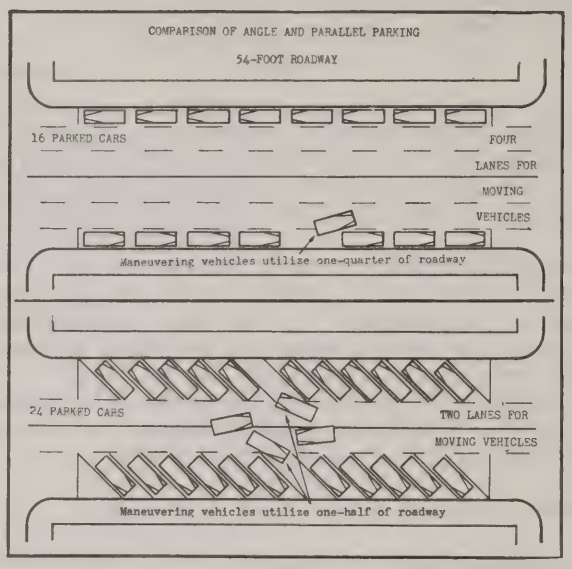
2. To reveal parking practices which represent the uneconomical or inefficient use of street space.

3. To prove or disprove need of parking meters.

4. To show need of off-street parking areas.

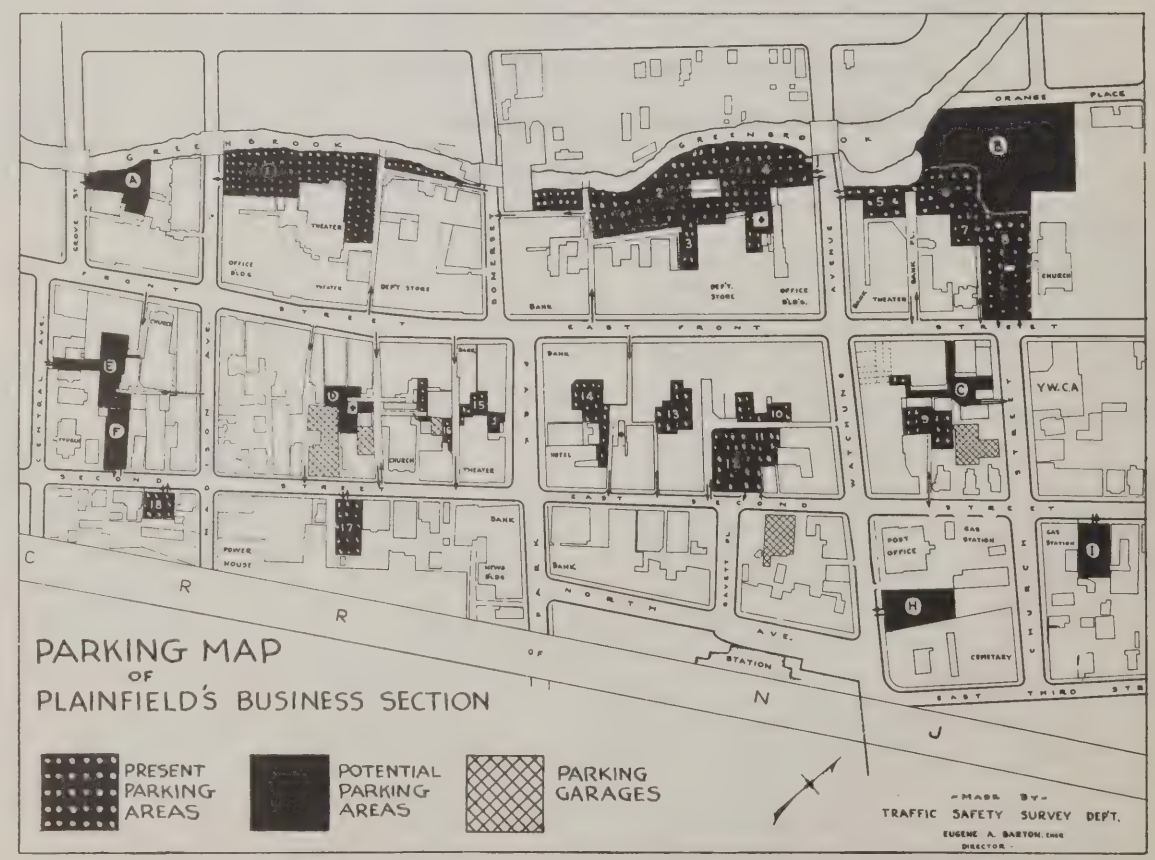
5. To show number, capacity, and use of existing or potential off-street parking areas.

CURB PARKING



—Chart by Jensen, Bowen & Farrell

OFF-STREET PARKING



—from Plainfield, N. J., Traffic Survey

A Survey of the Business District May Reveal Potential Off-Street Parking Areas

ORIGIN AND DESTINATION STUDY

Purpose. To show by numbers and types the origin and destination of traffic using any given block, street or series of streets.

When and Where to Make Study. The study should be made when and where the following conditions exist or are believed to exist:

1. Where vehicles, lacking a direct route, are forced to use an existing route that takes them to their destination in a roundabout way.

2. On a block or street so congested by misrouted traffic that other traffic is forced to use a roundabout route to reach destination.

3. Presence of commercial traffic on a major street or in the business zone which could be routed to reach its destination by another route more satisfactory to all concerned.

4. Presence of tourist and through traffic on a given block, street or in the business section which might well be routed to less congested streets and around business sections.

In most communities under 100,000 population this study can be confined to the origin and destination of traffic using the main arteries leading in and out of central business district. Such a study will show the amount and type of local traffic from the different sections of the city destined for the central business district as compared to the amount and type of traffic with its destination beyond the business district. Also it will show the relationship of local to through or out of town traffic by classes of vehicles. If desired, it can also be made to show the potential purchasing power of the through traffic. (See Field Method #1 below).

Personnel. The personnel for each O-D station is composed of one observer and one recorder. (Sometimes a police officer in uniform is also needed - see Field Method #1 described later). The total personnel for the entire study depends on the number of stations and the length of time and days over which the study is extended.

Equipment. Pencil. Field sheets. Summary sheets. Watch.

Time and Length of Study. Ideally the study should be conducted and completed on one normal weekday during a 12-hour period from 7 A.M. to 7 P.M. Limited personnel does not always make this possible, however. It may be necessary therefore to check only one station per day from 7 A.M. to 7 P.M.

While a 12-hour O-D study is ideal, it is not always necessary. Usually a check during the morning and afternoon peak hours of 7 to 9 A.M. and 4 to 7 P.M. will be sufficient to answer the O-D questions.

Field Method #1, described below, must be used if personnel is limited and the observations are for less than 12 hours. Field Method #2, also described below, is applicable only where the study is completed on the same day it is started and is conducted for 12 hours. Field Method #3 must also be completed on the same day it is started but does not have to run for a full 12 hours.

Occasionally O-D studies are made on other than normal weekdays. Usually Saturday or Sunday traffic conditions may warrant special study. Studies of these days are particularly valuable to those cities handling heavy vacation and recreational traffic.

ORIGIN AND DESTINATION

FIELD SHEET
(QUARTER HOURLY)

Station # .....
Inbound .....
Outbound .....
Sheet # .....

Date ..... Location .....
Weather ..... Time .....

1	2	3	4	5	6
VEHICLE DESCRIPTION			ORIGIN	DESTINATION	ROUTE USED
STATE OF REGISTRATION	REGISTRATION NUMBER	TYPE OF VEHICLE	BLOCK, STREET, ZONE, CITY	BLOCK, STREET, ZONE, CITY	STREETS, ZONES, OR HIGHWAYS

N.C.B. No. 40

Methods of Making Study. There are many methods of making this study. Three are presented here. The advantages and disadvantages are noted for each. The final choice must depend on local conditions.

Field Method #1 - Questioning Drivers. The drivers are stopped and asked their origin and destination. This method involves the least paper work and can be extended over a week or more. The stopping of the drivers, however, usually requires the assistance of a police officer, slows up traffic considerably and may antagonize the drivers unless skillfully handled. Generally a large portable sign explaining the project will prepare the motorists for the delay and help him to more quickly answer the questions. Of course, not every vehicle can be stopped on a major street. Only a sample is taken. This method has the added advantage of permitting the observer to ask the motorists if they intend to work or shop in the business district or go directly through without stopping.

Field Method #2 - Recording Vehicle Registrations. The vehicles' registration numbers (last three digits are sufficient) are noted at each station by 15-minute periods. The method does not require stopping traffic nor police assistance or special signs. It does, however, require that the entire origin and destination study be made in one day. A large field force is therefore necessary.

The summarizing also requires considerable manpower. A large amount of paper work is necessary to cross-check the registration numbers listed on the 15-minute field sheets of each O-D station against nearby O-D stations in order to trace the route and origin and destination of each vehicle. Usually not more than 60% of the registrations can be traced through the study. While this method will indicate fairly accurately whether stops were made in the business district, it does not make it possible to ascertain whether purchases were made. It remains true, nevertheless, that this method is the only practicable one for streets carrying more than two lanes of moving traffic.

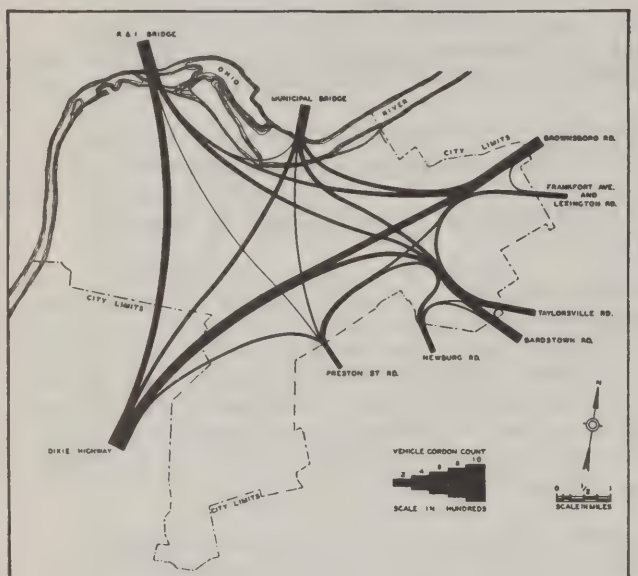
Field Method #3 - Card System. A card system can be used if the survey is only interested in determining at the city limits the routes followed by through traffic. In this system cards are issued to the incoming motorists at the city line. The time is noted on the cards or different colored cards are used for different periods of the day. As motorists leave the city limits the cards are collected and the time again noted. Through this method a check can be obtained of the number proceeding through the city to other destinations and the time consumed within the city limits. The average time required to pass from one limit to another is used as a basis on which to determine whether a vehicle is local or through traffic. In many surveys it has been assumed that all vehicles requiring less than one and one half times the number of minutes for a test car to go from city limit to city limit is a through vehicle. If, for example, thity minutes is found to be the average time for a test vehicle to go from city limit to city limit it is safe to assume that any vehicle traversing the distance is less than forty-five minutes is a through car and is probably part of that class of traffic which would by-pass the community if it were physically possible.

Field Sheet. On the opposite page is a sample field sheet which can be used with either Field Method #1 or #2. At the top of the form is space to record the date, location, weather condition and the exact 15-minute period of day in which this particular group of pbservations are being made. At the extreme right is space to note the station number, whether inbound or outbound traffic is being checked, and the sheet number. Below this are six columns. The first three are reserved for a description of the vehicles observed. Columns 4, 5 and 6 are used in Method #1 for recording the origin and destination of and route taken by each vehicle. A seventh column may be added if a record is desired of purchases made by through traffic. The purchase column can only be used with Method #1, however.

Field Method #1 requires that all six columns be filled out by the recorder as the vehicle approaches and the observer (with assistance of police officer) stops and questions the driver. If information about purchases is desired a seventh column must be added.

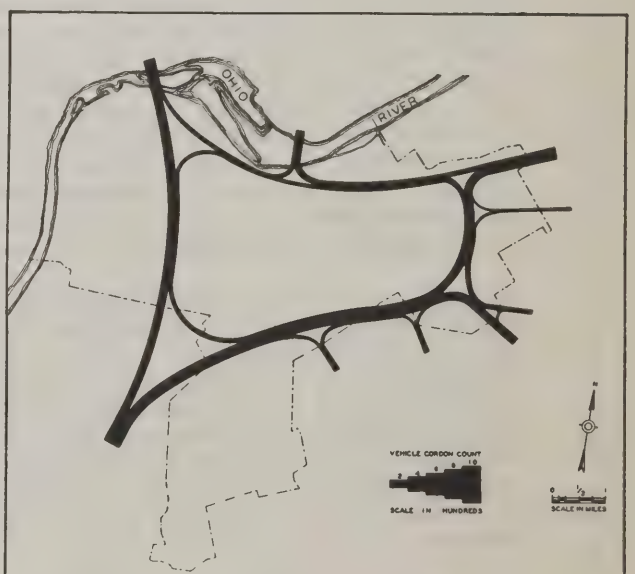
Field Method #2 requires only columns 1, 2 and 3 to be filled out. Special care must be taken, however, in recording a registration number (usually last three digits) of each vehicle passing and the use of a new group of field sheets every quarter-hour. This care is necessary because Method #2 depends on checking the registration numbers

GRAPHIC O-D STUDY



THROUGH TRAFFIC BETWEEN
CORDON GATEWAYS
LOUISVILLE. KY

JENSEN BOWEN & FARRELL, ENG-ANN ARBOR, MICH-CONSULTANTS



PROBABLE DISTRIBUTION OF THROUGH TRAFFIC
IF BY-PASS ROUTES WERE AVAILABLE
LOUISVILLE , KY.

JENSEN, BOWEN & FARRELL ENG-ANN ARBOR, MICH-CONSULTANTS

of one station with the next station and so on to determine the route taken by each vehicle.

Two sets of field sheets are needed at each station, one set for inbound recordings and the other for outbound. If the O-D study is very large, it is suggested that each station be given two numbers, an even number and an odd number. All inbound recordings can then be marked with even station numbers and outbound with odd station numbers.

Field Method #3 does not require a special field sheet. Small plain cards with a brief description of the O-D study for the information of the motorists and a sufficient space on which to record the entering and leaving time is all that is necessary. If the time is to be recorded by use of colors it will be necessary to have a sufficient supply of colored cards to handle each period of the day. The number of periods will, of course, depend on the amount of time required for the test vehicle to travel from city line to city line. If the time is 30 minutes a different colored card will be needed every 30 minutes.

Summary Sheet. No summary sheet is shown here. Each O-D study requires an original summary sheet. The great variance in the type and extent of O-D studies makes this necessary. The simplest type of a summary sheet is composed of vertical columns. Each column is designated "From Station No. - to Station No. - ". The number of such columns depends on the number and locations of studies.

Graphic Presentation. An example of an O-D flow diagram for through traffic, prepared by Jensen, Bowen and Farrell, is shown on the opposite page. This study was developed through the application of Method #3.

On the opposite page is also shown how this same through traffic, determined by the O-D study, could by-pass the city if the necessary streets and roads were available.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions, and the recommendations based thereon, should always be based upon facts. The facts collected by this survey will, if properly presented and studied, indicate the directions in which conservational effort should be applied.

Conclusions and recommendations will receive far more attention if presented in piecemeal fashion. This means, therefore, that many of the recommendations can and should be suggested before the completion of the survey. The form in which these are presented varies with the individuals and subject involved but in a majority of cases the conclusion and recommendations can be submitted in letter form. The recommendations should be given to the General Chairman of the safety committee who will refer them to the proper sub-committees for consideration and action.

Since the majority of recommendations are reviewed or received by laymen, do not use technical terms. Make sure that all recommendations are accompanied by detailed explanations or charts if there is any chance of misunderstanding.

Keep the recommendations practical. Do not make suggestions that are unreasonable or out of the community's reach.

Should the necessary ultimate solution be an expensive one, upon which the community cannot take immediate action, suggest a temporary solution. Where such a procedure is followed be sure to distinguish between the two and give reasons for the temporary solution.

FINAL REPORT FORM

At the termination of the survey all the findings, conclusions and recommendations should be properly collated and presented in the form of a report. As suggested in the final report form, the survey has two different parts:

Part One includes all the conclusions and recommendations but only a summary for the findings.

Part Two gives in full detail all the findings, and is used largely to verify the material presented in Part One.

Since Part One is to be most widely distributed, make it as interesting as possible. Photostatic copies of letters and newspaper clippings about the survey and its activities will be helpful. Add life to the charts and graphs by using colors.

Here is a report form which has been successfully followed on many surveys:

SAMPLE REPORT FORM

PART I

(Prepare a sufficient number of copies so that all principal survey and safety committee members can receive a report.)

Table of Contents
Foreword
Highlight recommendations of all sections
- Accident Facts
- Engineering
- Enforcement
- Education

Introduction

REPORT FORM

Sec. #1 - Accident Facts
- Foreword
- Findings - charts, tables, graphs, etc.
- Conclusions
- Recommendations

Sec. #2 - Traffic Engineering
- Foreword
- General Recommendations
- Worst Corner Composite Study
  - Findings
  - Conclusions
  - Recommendations
- Worst Corner Individual Studies (Consider each separately)
  - Foreword
  - Findings
  - Conclusions
  - Recommendations
- Field Studies (Present each as a separate section of report but do not fail to tie together to aid in drawing conclusions and making recommendations)
  - Foreword
  - Findings
  - Conclusions
  - Recommendations

Sec. #3 - Motor Vehicle Law Enforcement
- Police Department
  - Findings
  - Conclusions
  - Recommendations
- Courts
  - Findings
  - Conclusions
  - Recommendations
- Traffic Regulation
  - Findings
  - Conclusions
  - Recommendations

Sec. #4 - Safety Education
- Child
  - Findings
  - Conclusions
  - Recommendations
- Adult
  - Findings
  - Conclusions
  - Recommendations

PART 2

(Prepare a limited number of reports in which all the detailed facts and field studies are presented. Those who should receive a copy of Part 2 are the Mayor, Chief of Police, City Engineer, Safety Committee Chairman, Survey Director, and Chief Survey Engineer.)

Sec. #5 - Appendix
- Accident Facts Details
- Field Study Details
- Enforcement Details

SOURCES OF MATERIAL & INFORMATION

National Organizations

National Conservation Bureau, 60 John Street, New York
National Conference on Street & Highway Safety, Washington, D. C.
National Safety Council, 20 No. Wacker Drive, Chicago, Ill.
American Automobile Association, Washington, D. C.
Institute of Traffic Engineers, 60 John Street, New York
U. S. Bureau of Public Roads, Department of Agriculture, Washington, D. C.
Bureau for Street Traffic Research, Yale University, New Haven, Conn.
International Association of Chiefs of Police,
Safety Division, 1825 Orrington Avenue, Evanston, Ill.
Insurance Companies (Write National Conservation Bureau for list)

State Organizations

Motor Vehicle Department
State Police
State Traffic Commission
State Safety Councils
State Department of Education

County Organizations

County Police
Safety Council
County Officials

Local Organizations

Police Department
City Engineer
Clerk of Court
Chamber of Commerce
Safety Commission or Council
Public Utilities
Transportation Companies
Insurance Agents

INDEX

(Figures in italics indicate illustrations)

A

C

E

INDEX

F

G

I

L

M

N

O

INDEX

P

S

T

V

W